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The National Magazine of Shipping

JANUARY, 1926

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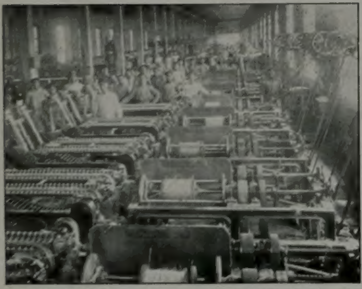
Pacific Marine Review, Vol. 23, No. 1. Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.



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Pacific Marine Review

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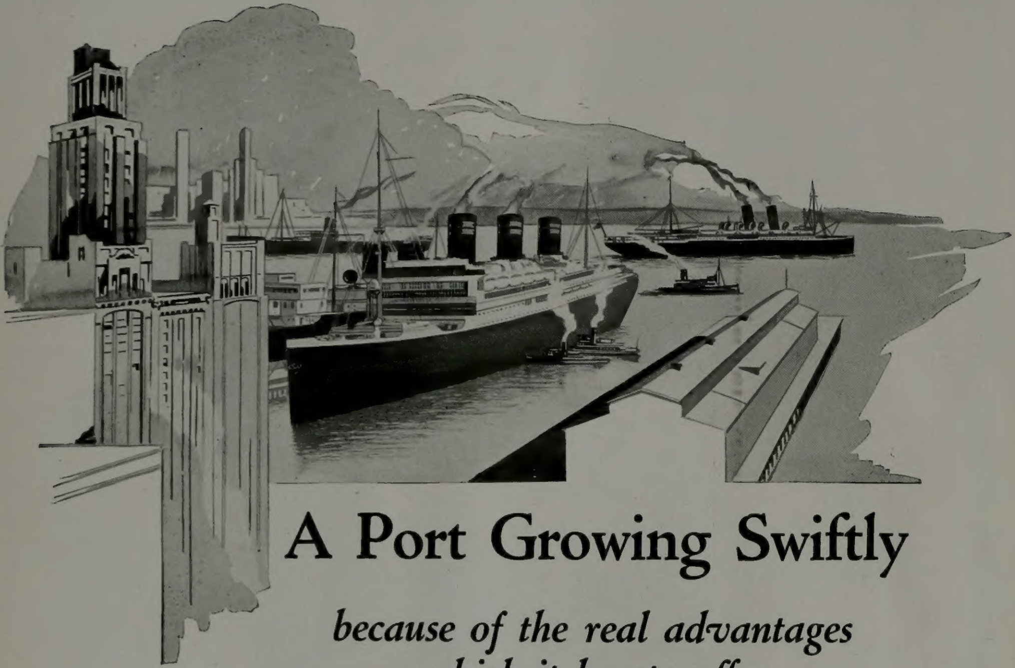

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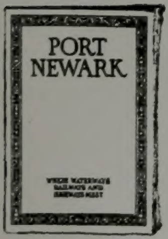

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Pacific Marine Review

The National Magazine of Shipping

Official Organ
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576 Sacramento Street, San Francisco
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Wm. Z. Gardner, Special Eastern Representative.

Official Organ
Shipowners' Association of the Pacific

Member of Pacific Traffic Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1924, by J. S. Hines.
Published on the 25th of each month preceding the publication date.
Advertising and editorial forms close on the 15th.
Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

The Outlook for Pacific Ocean Shipping

An Analysis of the Conditions Facing the American Merchant Marine on the Pacific Ocean, Made by a Group of Men who Speak with Authority from Long Experience

PACIFIC MARINE REVIEW, wishing to present to its readers a cross section of the opinions of shipping men as to the immediate commercial future for Pacific Ocean shipping, sent out recently to a selected group of shipping leaders communications requesting their reaction to the following questions:

1. What are the prospects for the American shipowner on the Pacific in 1926?
2. What is the most important business development facing Pacific shipowners?
3. What can the Pacific shipowners do to develop new business?

Naturally in the mind of a busy executive the problems facing his own organization bulk largest, and this is reflected in some of the replies. Along with this, however, there is in every case an evident desire and purpose to present the problems fairly as they affect the whole merchant marine situation.

The result is a group of short, pithy, "straight-from-the-shoulder" articles by men of practical knowledge and long experience.

Get Alaska Working

By H. F. ALEXANDER,
President, Pacific Steamship Company.

OUR business, both freight and passenger, has been very unsatisfactory for the past two years up to June this year, when things began to improve. Since that time there has been a steady increase in traffic, and at the present time all of our steamers are operating with the exception of one, and there is every indication that this activity will continue throughout the new year.

From the standpoint of coastwise traffic the most important problem we have to face is to spread the fame of the Pacific Coast and Alaska, so that tourists from the East will come out West to spend their summers, and also their winters, as the Pacific Coast has the East beaten on climate either season. The importance of this problem has already been realized by our chambers of commerce and other interested organizations of the Pacific Coast States. They have now united in a campaign of advertising that will be of exceptional benefit to the whole Pacific Coast.

There are several important problems facing the shipowner on the Pacific Coast, the most important of which is the recent agitation to have the intercoastal steamship lines placed under the palsied hand of the Interstate Commerce Commission. To me this would be a serious mistake. We have all witnessed the life and death struggle which the railroads have had to undergo in the past on account of the restrictions and minute regulations placed upon them by the Interstate Commerce Commission. I am firmly convinced that we should follow President Coolidge's recommendation that there should be more business in government and less government in business. If the intercoastal steamship lines are ever placed under the domination of the Interstate Commerce Commission it will be only a question of time until American ships are regulated to death, with all the attending chaos, delay, procrastination, numerous heart-breaking conferences, and discouraging results, attendant upon this expensive, slow-moving, governmental body.

Another problem of importance on the Pacific Coast is the granting of statehood to Alaska. Under the stifling regulations of numerous governmental bureaus the resources of Alaska are locked up and the population is gradually dwindling. Its permanent residents have not the financial resources to develop Alaska and outside assistance must be secured. With other states offering greater attractions and fewer restrictions, why should the American business men invest their capital in Alaska where the permanency of their enterprises is made insecure by the conflicting rulings of governmental bureaus? It is high time that Alaska should cast off the swaddling clothes of infancy, and the granting of statehood is its salvation.

Our Oriental business does not compare favorably with the year 1924, but Oriental traffic has always been subject to these periods of depression followed by longer periods of activity. There is every indication of an increase in business with Japan, China, and the Philippines during the year 1926.

Terse Common Sense

By ROBERT DOLLAR

THE prospects for 1926 are that there will be as much freight to move as in 1925; but there are so many ships idle that there are no prospects of better freight. So the prospect of making any money is not good.

The most important business for American shipping on the Pacific will be the continued improvement to and from the Far East. Lumber and general merchandise, mostly canned goods, outwards and raw materials homewards.

The merchants must send their best men to develop new business and increase trade; the shipowners contributing by their officers, agents, and managers in foreign countries boosting for United States manufactured goods, and by properly caring for the goods they carry, seeing to it that they are delivered in as good order as they receive them. Prompt delivery right on scheduled time is a great and important part in trade development.

Prospects Bright

By K. H. DONAVIN,

Manager Operating Department, Panama-Pacific Line.

It seems to me that the American shipowner on the Pacific Coast may look forward to a good year in 1926. As a whole, all the trades seem to be in fairly good condition, the intercoastal being particularly bright.

Unfortunately the shipowner himself has a small part in the development of new business, which must come from American business and banking as a whole. New business will come when our mercantile houses, exporters, importers, and raw material producers send more of their representatives to foreign territories, and at the same time provide proper banking connections.

A Bright Future

By HUGH GALLAGHER,

Operating Manager, Oceanic Steamship Company.

THE prospects for the American shipowner on the Pacific in 1926 are reasonably bright. Looking back over the record of imports and exports, one cannot help but feel that there will be a very substantial increase in trade, and that the momentum which has been gained by the Pacific Coast cannot be stopped, but instead, that it will gather more force as the time goes on.

I have predicted in the past, and I still feel that the next ten years will see a hundred per cent increase in our import and export tonnage through the port of San Francisco, and my observation is that the other ports will fare almost as well.

I do not know of any specific business development problem facing Pacific shipowners. There are many local ones of more or less importance, for instance, the development of terminals at San Francisco. At the present time thousands of dollars are being spent because of congestion on our piers, and this fact has been recognized by the Harbor Board and steps are being taken to correct it by the addition of more piers and increased facilities.

It is rather difficult for Pacific shipowners to develop new business. They can, of course, gain more business for their particular concerns by taking it away from a competitor but that is not what you mean, I feel sure. Ship owners and shipping men, I believe, can do some work by pointing out trade possibilities to their various connections. I have in mind particularly Australia, which is developing as the United States developed following the Civil War. Colonists are being sent there by Great Britain, and there will be a considerable expansion of our trade with Australia as our products became known. I feel satisfied that if the Pacific Coast concerns would send their representatives to Australia and make connection with local firms there to handle their products, it would not be long before a very satisfactory business could be built up. American automobiles are in great demand in Australia, and friends of mine say that American goods are looked upon as being extra fine.

Unshackle the Shipowner

By A. E. ANDERSON,

President, California Transportation Company.

I AM not engaged in foreign trade. Our business is entirely on our inland waters. However, I am keenly interested in the further development of our foreign trade and understand and appreciate some of the problems confronting the American shipowner in competition for world trade. I could not answer categorically your three questions, but in view of present conditions confronting American vessel owners and operators, unless Congress speedily provides some relief of intolerable conditions brought about through conflict of provisions in the Naturalization Law, the Immigation Law, and so-called La Follette's Seamen's Act, the American shipowner will not have a chance to compete and the American flag will disappear in foreign ports.

Also, we are reminded of the provision injected in the last tariff which provides a duty of 50 per cent on all repairs (including labor and material) made in foreign ports notwithstanding the urgency and necessity of such repairs, even for the safety of the vessel.

If every importer, exporter and producer in this country who looks for a foreign market for his product would analyze the shipowner's problems, he would get busy and insist upon Congress unshackling the shipowner.

Eliminate Government Operation

By J. E. CUSHING,

Traffic Manager, American-Hawaiian Steamship Company.

THE answer to your three questions is hard to give until the position of Congress is more definitely defined. Legislation of all kinds is pending. Some of it will help the American shipowner and some of it will hurt him. If the activities of the Government in and toward shipping follow the lines taken during 1925, it seems reasonable to expect that Pacific Coast prospects will be slightly better than in 1925. There is every assurance of a tremendous movement of lumber to the Atlantic Coast, which will employ a very considerable tonnage. The general effect of this should be good, although the particular effect on westbound intercoastal operation will probably be the reverse.

The most important business development problem for the American shipowner, wherever he operates, is a rather negative one involving the elimination of the government from the business as an operator and the avoidance of unreasonable regulatory interference.

It seems to me that the maintenance of good service at competitive rates is the only way to get new business.

Consolidating Progress

By RALPH J. CHANDLER,

Vice-President and General Manager, Los Angeles Steamship Company.

SUBSTANTIAL progress has been shown during the past year by the shipping industry of the Pacific Coast, and the prospects are bright for further improvement in 1926. The increased tonnage and passenger volume handled at Pacific Coast ports has resulted through the aggressive spirit shown generally by shipping men in their provision of increased facilities and in their cooperation with all available shore agencies in the development of markets and of public travel interest.

It is probable, however that the shipping industry as a whole both on our east and our west coasts has suffered more than any of the other large industries through post war conditions. Its progress has been shown in the face of very stiff obstacles since, while re-creating and further expanding the trade lost during the war period, this industry has been obliged to absorb or digest a great tonnage of wartime bottoms sold by the Shipping Board and therefore creating constant competition for established organizations to overcome.

The keenest competition has naturally been felt by freight carriers because of the great number of frighters built during the war, and since sold at very low prices and entered into shipping routes in competition with lines that had worked hard to build up the business of such routes. While the supply of the United States Shipping Board vessels was large, it, of course, is slowly being exhausted, and when this shall have been accomplished, shipping men have reason to look forward to more stabilized conditions. Once this stage is reached, with no further fear of revolutionizing competition through wartime built tonnage, the industry will become firmly founded and will then be in a position to consider new construction properly adapted to its several needs.

Shipyard activity, except, perhaps, in the case of isolated instances where new passenger vessel construction is required, can hardly be expected until the industry has had this opportunity to fully digest the wartime ship tonnage. In the meanwhile however, trade lines are being established, markets are being developed, and when all low priced tonnage is gone the industry will know its needs and on a firm foundation will be in a position to build accordingly and carry on its efforts with reasonable business profit possibilities.

Conditions Fundamentally Sound

By H. C. CANTELOW,

Vice-President, Luckenbach Steamship Company.

TRADE conditions on the Pacific Coast and throughout the country are fundamentally sound. Business men are in an optimistic mood. Stocks in merchants' hands are, in the main, low. There is the greatest distribution of wealth and property among the greatest number of people within the history of the nation, evidenced in part by constantly increasing savings bank deposits and constantly increasing life insurance. There seem to be good grounds for hoping that the main features of Secretary Mellon's views on tax reductions will be accepted by Congress.

Because of these things and because business men believe that the Administration will deal with business problems fairly and with much common sense, I think the prospects for the American shipowner in 1926 are good, provided he is operating his ships in protected domestic trades.

When the people of the United States decide that there shall be an adequate privately owned merchant marine, and will back with dollars their determination to have one, American shipowners will establish their ships in foreign trade.

The most important problem facing the American shipowner at the dawn of 1926 will be, as it has been for many years, How much longer must we wait for relief from restraining legislation? When will the government get out of the shipping business? When will theorists cease telling us that we could compete with foreign ships at a profit, without federal aid, if we would?

Our coastwise trades have been well taken care of in the past and will be in the future, protected as they are by a wise governmental policy, which reserves domestic commerce for American ships.

Pacific shipowners can do little more than they have already done to develop new business, unless, as some people believe Congress enacts constructive helpful legislation which will induce hard-headed business men to invest money in ships with a reasonable expectation of operating them in foreign trades at a fair return on the investment.

The Situation Analyzed

By A. F. HAINES,

Vice-President, Pacific Steamship Company.

"WHAT are the prospects for the American shipowner on the Pacific in 1926?" There are only about three American shipowners in the trans-Pacific trade. The principal one is the United States Government.

If you refer to trans-Pacific shipowners as a whole, then my opinion is that the prospects are good. The year 1925 has been a poor one for the shipowner in the trans-Pacific trade; 1926 is going to be much better, both coming and going. We are on the upward line of the curve. Rates are stable and westbound cargo sufficient. The passenger business on the Pacific has been decreasing for nearly three years. We hope and believe it has reached the bottom of the chart, and the line must go up again. The prospects, however, depend upon a number of things including:

(a) the political stabilization of China; (b) the financial stabilization of Japan; (c) legislation by the present congress; (d) elimination of the government from steamship operation.

"What is the most important business development problem facing the shipowner?"

"What can Pacific shipowners do to develop new business?"

These two questions can both be dealt with together. There are so many of these problems that it is difficult to pick the most important.

The problem of homeward cargo ranks high. Our exports are bulky. Our imports are valuable but of small bulk. The "balance of trade" in our favor does not mean balanced cargoes. Empty ships homeward keep outward rates high and profits nil.

The establishment of manufactories and industries on the Pacific Coast is a weighty problem for the Pacific shipowner. We require factories on the Pacific Coast to export across the Pacific. We require manufactories to consume raw materials imported across the Pacific.

Population is necessary before these factories and manufactories can succeed. The coastwise advertising program of the Chambers of Commerce will be of great assistance.

Philippine Island trade should be cultivated and increased. We do not properly appreciate the value, extent, and possibilities of these islands in the way of developing trade and traffic. Extension of our coastwise laws to the Philippines would be a great boon to the American shipowner without harm to the importer or exporter.

The Shipping Board tonnage is a problem, not only for the American shipowner, but to the foreign owner as well. We hope its solution will soon be found.

The Shipping Outlook

By **NORMAN F. TITUS,**
Manager, Claims-Insurance, McCormick Steamship Company.

THESE are momentous times. The war-sickness is passing; the Locarno pact seems to indicate that the former belligerents of Europe will be able now to devote their energies to trade and commerce. For the world, this unquestionably means a great era of prosperity such as history informs us has followed every great war of modern times.

The United States is now a creditor nation. She also produces more than she can consume. As a consequence, whether she wills it or not, she is forced into foreign trade—into the world struggle for business. With conditions such as these, it is but natural to take stock of the situation and consider the means for better facing the maritime issues before the country.

Private Ownership.

At the close of the war, our government found itself the owner of the greatest fleet of merchant ships in the world. This fleet was constructed as a war measure, and we all know that one of our most engrossing problems of the past eight years has been the question either of operating this fleet or of disposing of it to private owners. This is our greatest problem. It is hoped that the present Congress will dispose of it, for never before have we been in a better position to reach a solution. As aids to this solution, the Chamber of Commerce of the United States has held meeting throughout the country and has given a definite statement of its views; the shipowners in convention in New York on May 9, 1925, promulgated their complete views on problems affecting the American merchant marine; Mr. Dalton, the personal representative of President Coolidge, has made his report; also Secretary Herbert Hoover has announced the results of his study of the question. Without doubt the most immediate result will be the transfer of most of the government fleet to private hands. With this accomplished we will have taken a long stride in the direction of a real American merchant marine.

Operating Differential.

The next most important shipping problem is that of our operating differential. The costs of physical operation of American merchant ships are from ten to fifteen per cent higher than similar costs of competing foreign vessels. This disadvantage arises both from legislative requirements and restrictions and from higher capital charges, which in the main have their genesis in commendable causes—better wages and better conditions of American labor. Prior to the war, these factors had been sufficient to confine the American merchant marine largely to those waters from which foreign competitors are excluded by law, namely, the coastal trade. Without a doubt our present legislative program will so greatly modify these conditions that our enlarging commercial program will be certain of success.

Unquestionably one of our great problems now is, and for some years to come will be, to coordinate properly the shipowning and operating business with the shipbuilding and marine insurance business. The shipbuilding business must be fostered, and eventually we must have our marine insurance and our classification placed entirely in American societies or companies.

Bills of Lading.

Furthermore, our bill of lading in the foreign trade must be standardized in keeping with other nations. In October 1922 the diplomatic representatives of twenty-four maritime nations met at Brussels and signed a protocol which was to become an international convention upon ratification by the governments represented by the signatories. This convention is based on the Hague Rules of 1921, and is substantially similar to these rules. It aims at codifying and unifying, by an international agreement, the dissimilar laws and practices relating to bills of lading in practise in the various maritime nations of the world. The general adoption of the convention would have the effect of establishing a recognized code of conditions; would remove anomalies which exist at present; would obviate the necessity for the inclusion of many of the numerous clauses now appearing in most modern bills of lading; and would amplify and standardize, on an international basis, the conditions common to ocean bills of lading.

Great Britain ratified this convention by passing the Carriage of Goods by Sea Act of 1924, which became effective January 1, 1925. Our Congress considered the matter in 1923, but the bill failed to pass. It was again considered in 1924 under what was known as the Edmonds bill, but this shared a similar fate. It is to be hoped that the present Congress will join with these other nations and pass a Carriage of Goods by Sea Act that will standardize and simplify our bill of lading.

Shipping Arbitration.

A third prominent issue is that relating to shipping disputes. Whenever possible they should be settled by arbitration under the terms and conditions of the Federal Arbitration Act that becomes effective January 1, 1926. This is the most logical, satisfactory, and efficient way of settling disputes. It does not possess any of the shortcomings of litigation and settles the controversies quickly, equitably and what is vitally important generally without loss of goodwill. This remedy is peculiarly adapted to the shipping business because the liabilities and limitations of the ocean carrier are so little understood.

Efficiency Factor.

Another vitally important factor in this matter of a forward outlook is the question of greater efficiency. In this struggle for world supremacy it may be predicted that America will succeed not by exhibiting a greater capacity for lowering wages, but rather by the introduction into shipping practice of these same elements of efficiency and standardization so characteristic of American genius in the industrial field. Industrial executives have discovered that the man problem is the really vital one, and the greatest successes in industry are the outcome of the recognition of this principle. In shipping the human element has been almost entirely neglected. If the shipowner will profit by the experience of the industrial manager in handling the labor problem, he will find his profits greatly increased.

Terminal Costs.

Terminal operations, the greatest variable in shipping, should be subjected to intensive study. Costs should be cut and turn-around of ships should be reduced. It should be pointed out that more extensive use should be made of lighters, as is done in the great ports of Europe. Also we are woefully deficient in the coordination of wharves and warehouses. The success of the Bush Terminal in New York makes more striking this deficiency in other ports. Furthermore, America, the greatest mechanical nation in the world, is far behind other nations in the use of mechanical devices as applied to this business. These considerations serve to point out the potentialities of American shipping.

International Viewpoint.

It should be emphasized, moreover, that one of the greatest problems is the necessity for the development of a foreign trade consciousness and an international viewpoint in the American people. Let us face the fact—Americans are provincial. The people of the great European maritime nations think of the sea and they think internationally. Furthermore, in those countries men serve long years of apprenticeship to the shipping business. In America we find ourselves in a renaissance of trade and shipping without an informed public and without a large mass of properly trained personnel to carry on these businesses.

Obviously, shipowners and merchants should support and indorse, with all means in their power, avenues of education and activities of foreign trade clubs and foreign trade bureaus of chambers of commerce. Also more general use should be made of the marvellous facilities developed by Herbert Hoover in the Bureau of Foreign and Domestic Commerce.

The Tax on American Foreign Traders

By O. K. DAVIS, Secretary, National Foreign Trade Council.

THE inclusion by the House Ways and Means Committee of a provision in the tax revision bill relieving Americans in foreign countries from taxation upon income earned in promoting American foreign trade is hailed by foreign traders throughout the United States as a hopeful indication that the end of the long fight for this relief is at last in sight.

The present terms of the agreement in the committee on the application of this provision are to the effect that individual citizens engaged in foreign trade are to be exempt from income tax on salary or commissions from the sale of United States products for export if engaged in making such sales outside the United States for more than six months in the year.

Trade associations and chambers of commerce in this country, and American chambers of commerce in other countries, have been urgent for years in the effort to secure this legislation.

The news of the action of the Ways and Means Committee will be a welcome encouragement to many Americans all around the world who are representing the United States business houses and devoting themselves to furthering foreign trade. The United States is the only trading nation in the world which has maintained the policy of taxing its nationals engaged abroad.

There is no real justification for such a tax at the present time. It lays an unnecessary and vexatious handicap upon American foreign trade which more than offsets the small amount of revenue it brings to the government. Its present effect is also to increase the difficulty of securing competent men to represent American trading houses in the other countries, by subjecting them to what they all regard as an unfair discrimination. They find at once that their British, French, German, and other foreign competitors are not taxed by their home governments in this way, and the result is a rankling grievance.

Everybody in the United States knows that we are facing constantly keener competition in our foreign trade. In the effort to meet that competition we are served chiefly by two factors, production and salesmanship. It has always been American national policy to foster and promote production. The government has spent hundreds of millions for that. But at the same time the government has taxed and handicapped salesmanship. The action of the Ways and Means Committee now gives promise that this particular handicap is near its end.

This interesting illustration is published through the courtesy of the Southern Pacific Company.—It represents a wash drawing of the old Long Wharf at Oakland, California, that is now the Southern Pacific Mole. The drawing was completed in January, 1873.

National Merchant Marine Conference

Report of the Conclusions Reached in Joint Session by the Merchant Marine Committee of the Chamber of Commerce of the United States

We here publish a full abstract of the conclusions of the National Merchant Marine Conference. It is noteworthy that the findings of these committees, which represent an industrial and commercial cross section of the United States, are in substantial agreement with the recommendations of the American Steamship Owners' Association.

THE national merchant marine conference held by the Merchant Marine Committee of the Chamber of Commerce of the United States has reviewed with the greatest care the major phases of the problem before it, in the hope that this expression of its views may be of some value to the governmental authorities, to those engaged in the various phases of the shipping business and to the public which this industry must adequately serve. As a result of its deliberations the conference submits the following statement of its conclusions:

Maintenance of Services

1. The steamship lines now in operation in the foreign trade of the United States, most of which are operated by or for the account of the government, are needed in the interest of the development of American foreign commerce. With relatively few exceptions they are adequate and effective for this purpose. This government tonnage is carrying commerce which before the war was, in part, served by steamers under foreign flags and in part not served by direct steamship services, the business, if conducted at all, being carried on by roundabout routes generally involving transshipment at foreign ports. The new services established since the war have contributed very materially to the expansion of foreign trade, notably the export market for agricultural and industrial products. Yet, only 40 per cent of the volume of our foreign ocean-borne commerce is now being handled in American bottoms.

Tonnage owned and operated by or for the account of the government should as promptly as possible be transferred into private hands, but it is vital that provision should be made for the maintenance under the American flag of the necessary tonnage to serve this foreign trade. There are, however, serious obstacles to the accomplishment of these purposes in the face of foreign competition, and there is urgent need for the enactment of measures to these ends.

A continued expansion of this trade is to be anticipated, which will, in the future, call for additional tonnage and eventually for additional lines. This, with the introduction of motor vessels and other improved types, will be necessary to carry out the national objectives as defined in the Merchant Marine Act.

National Defence.

2. In general the requirements for the national defense correspond with the requirements of a well-balanced merchant marine to meet the needs of our foreign trade, including, in addition to existing American tonnage, cargo liners of improved type and combination passenger and cargo liners. High-speed passenger express steamers are also needed as reserve naval auxiliaries and for postal service.

Regulatory Laws.

3. Our laws relating to the regulation of shipping are, in the main, based on sound principles, including the reservation of the coastwise trade for American-built vessels under the American flag (which is a fundamental part of the merchant marine policy of the United States, requiring in some cases more rigid application) and the laws for the prevention of unjust discriminations as between shippers, unreasonable preference or disadvantage to any person, locality, or description of traffic, and other unfair discriminations. Some of the laws, however, require modification:

(a) The Seamen's Act, besides containing provisions intended to promote the safety of life at sea, affords highly desirable protection to American labor and standards of living necessary to attract the type of citizens required to man a merchant marine of the highest class. This, however, constitutes one of the handicaps which render it generally impossible for American vessels to meet foreign competition in the overseas carrying trades. Certain provisions of the Act, having no relation to the maintenance of living standards, but interfering with the morale and efficiency of the crews, should be modified to such extent as is necessary to correct these conditions, notably the requirement for the payment of half wages at foreign ports when the seaman concerned has a record of drunkenness, desertion, incapacity through use of drugs, or other disorderly conduct resulting in delayed sailings and lack of proper discipline.

A careful investigation is also recommended as to the relation of seasonal restrictions on Great Lakes shipping to the facts of lake navigation conditions, and as to the crew employment provisions applicable to services involving runs of only a few hours between ports. Provisions that increase lake transportation costs to the public without adequate reason therefor should be revised.

(b) To place responsibility for accidents to marine workers, including longshoremen, on a definite basis similar to that established for other workmen through the workmen's compensation acts of the states, the enactment of a federal maritime workmen's compensation act is recommended.

(c) Prompt legislative action is recommended to remove difficulties now encountered in connection with documentation of vessels under American laws; to correct the present unsatisfactory general system of measurement of vessels by the United States Government; and to modify the Panama Canal measurement rules so as to simplify and equalize the computation of canal dues.

(d) Existing restrictions upon the sale of American vessels to foreign ownership constitute a handicap against the investment of capital in shipping and replacement of obsolete and worn out tonnage by improved types. These restrictions should be removed, except as to government tonnage sold at depressed market values, or tonnage built or operated under contracts providing for government aid.

(e) The navigation laws of the United States, and the laws and rules relating to the inspection of vessels and safety of life at sea, need revision to adapt them to modern conditions and practices. It is recommended that Congress authorize the President to appoint a special technical commission for this purpose.

(f) At some ports new quarantine stations and a larger quarantine personnel are needed to expedite and reduce the cost of handling vessels. This need will become greater with the anticipated growth of the American merchant marine.

Shipping Board

4. The attempt to combine in the Shipping Board (a) semijudicial regulatory duties, (b) certain responsibilities for the promotion of shipping, and (c) the executive function of administering and disposing of the government-owned fleet and other shipping property is unsound in theory and unworkable in practice. The unsatisfactory results are mainly attributable to fundamental defects in the machinery. In its very nature a board is not equipped to perform executive functions. It is therefore recommended (a) that the semijudicial regulatory duties embodied in maritime enactments be entrusted to a Shipping Board of three members; (b) that the functions relating to the promotion of shipping be transferred to the Department of Commerce; (c) that the executive duties pertaining to the administration of the government-owned fleet and the sale of shipping property be transferred to the Emergency Fleet Corporation, the president of which should be under the supervision of a national advisory board to be appointed by the President of the United States, with one of the members of his cabinet

as chairman, and with the addition of regional advisory boards to sit with the national board in determining policies affecting those regions in connection with the increase, decrease, or sale of trade-route services; (d) that the national advisory board, with the regional advisory boards concerned, be also charged with the duty of applying, in accordance with the principles and within the limits prescribed by Congress, any system of government aid that may be authorized.

Marine Department

5. The Department of Commerce, which is in general charged with the duty of promoting the welfare of the various branches of commerce and industry, is the logical agency for promoting the interest and welfare of the merchant marine. To this end it is recommended that, as far as practicable, the services of the Department of Commerce and those of other government departments specially relating to the merchant marine be concentrated under one head as a branch of the Department of Commerce.

Discriminatory Laws.

6. Preferential rail rates to shipments carried in American bottoms, discriminatory duties in favor of such goods, and other similar measures should not be put into effect at the present time, but the right thereto should not be surrendered.

Government Contracts.

7. Financial aid to enable American shipping to compete under the higher living and wage standards and higher shipbuilding, ship repair, and ship operation costs under the American flag, instead of being applied as a general ship subsidy navigation bounty applicable to all classes of vessels, should, it is believed, take the form of payment for services rendered, including (a) contracts for the maintenance of services to particular trade regions of the world especally important to our foreign trade and the expansion of markets for our agricultural and industrial products and (b) mail contracts to provide for maintaining the higher types of service needed both in the interests of our export and import trade and for the transportation of mails. Aid for merchant vessels of special types required primarily for military or naval reserve and postal purposes should be provided for in the appropriations for those purposes.

In order to protect the government interest, aid should be limited to such expenditures as the public interest requires.

Shipbuilding.

8. Besides the support secured to American shipyards through the restriction of the coastwise trade to American-built vessels, important additional shipbuilding capacity can best be maintained by establishing the American merchant marine in foreign trade on a profitable basis and limiting to American-built vessels any aid accorded ship operation. The continuance of a construction loan fund under favorable terms and interest rate, although not by itself a sufficient inducement to American shipbuilding, is regarded as a desirable assistance.

Taxation.

9. Taxation of shipping should, as far as possible, be simplified and made more uniform and more applicable to this industry, while double taxation of vessel earnings in the United States and abroad should be eliminated through extension of reciprocal arrangements. Other and more effective aids to shipping than tax exemption by the Federal Government will, however, be necessary if the American flag is to be kept on the seas in our foreign trade.

Ship Sales.

10. The policy of selling the vessels and the service facilities of the government-owned lines at reduced prices in consideration of an agreement to maintain the services for five years is recommended as a valuable expedient for disposing of portions of the government-owned fleet and securing the benefits of private enterprise in reducing operating costs and developing trade, pending determination as to which essential services can become self-supporting and which will require government aid to insure their performance.

If, in the interest of maintaining essential direct shipping services to the various trade regions of the world, a system of trade-route and mail contracts is adopted, such contracts will constitute an important consideration in the sale of government vessels and should facilitate their disposal. The operating results secured by the Emergency Fleet Corporation in handling the existing services furnishes a practical measure, subject to adjustment on account of special conditions, of which the regional boards would have specific knowledge, to guide in fixing the considerations in trade-route and mail contracts.

Federal Competition.

11. Until the disposal of its vessels is accomplished, the government should carefully avoid competing with any regular American flag service under private operation. A particular obstacle to the purchase of vessels by private capital lies in the uncertainty as to what is to be done with the residue of the government owned fleet so long as it remains available for repair and operation backed by federal appropriations. Additional tonnage should be placed in service only as conditions in the carrying trade commercially justify it. The best test of the desirability of new shipping services will be found in the readiness of private capital to invest in them.

Scrapping.

12. Surplus vessels, particularly those of small or non-competitive types, not salable to American citizens and not required in connection with present or prospective services, should be sold in the world market. Unserviceable vessels should be scrapped, giving the American market preference within its capacity to absorb the scrap material without damage to other industries.

Government Operation.

13. Pending disposal of the government vessels to private ownership, the government must continue the operation of the essential services to meet the needs of commerce. Charter to private operators had been attempted but found impracticable under existing conditions. While there are serious disadvantages in the M.O.4 agreements under which government vessels are now operated by managing agents, there being little inducement to the operators to purchase the vessels and services, some such form of operating agreement appears to be necessary at the present time. In order to facilitate disposing of the lines on advantageous terms and putting the services on a permanent commercial basis, it is of particular importance that the managing agents be parties who are able and willing to become purchasers.

Foreign Trading Facilities.

14. In addition to providing for the maintenance of a merchant marine in private hands under the American flag adequate to the needs of our foreign trade and national defense, it is of great importance that meas-

ures also be taken to aid the development of the widespread organization and facilities necessary for the success of such a merchant marine, including American agencies in foreign ports, adequate terminal facilities in all such ports, American banking institutions in foreign countries, free trade zones or free ports at proper points on our coasts to develop transshipment trade, an increase in American marine underwriting, schools for training officers, seamen, and shore personnel, and maximum cooperation of the consular, diplomatic, and trade promotion agencies of the government.

American Goods in American Ships.

15. In order to offset the practice of foreign exporters and importers of specifying wherever possible that their goods be shipped by vessels flying the flag of their nationality, American merchants should similarly favor American vessels in connection with their import as well as their export shipments. It is also of great importance that general popular patronage of American freight and passenger vessels by American citizens be stimulated in every reasonable manner.

Along the Atlantic Coast

Special Correspondence from New York.

TWO plans for stripping the Shipping Board of its control over the operation and disposal of the government fleet of merchant ships have already been brought to the attention of the new Congress and others are certain to follow. The most drastic measure is that of Senator Edge of New Jersey, providing for the abolition of the Board and the transfer of its functions to the Fleet Corporation. It also gives the President power to transfer any of these functions to the Department of Commerce.

The measure, which is likely to receive most favorable consideration in the House, however, is that of Senator Wesley L. Jones, giving the Flett Corporation full power over operation and maintenance of the government ships, in accordance with the desires of President Coolidge and his advisers, as expressed in the President's message, the Shipping Board to function as a judicial and regulatory body and to retain control of the construction loan fund. The Fleet Corporation, under the provisions of the Jones bill, would have full power to negotiate agreements, contracts and sales of vessels, while sales of docks, piers, terminals, warehouses, terminal equipments, leases, and other rights would be subject to approval by Congress. The bill also provides specifically that railroads may own and operate ships in foreign trade between the United States and the Philippines, provided they are not operated via the Panama Canal.

The Jones bill has the advantage of not running counter to the desires of the representatives of the various districts in regard to regional representation, and the Senator has indicated his willingness to accept any amendment that will give definite promise of helping toward a solution of the whole shipping problem. Consequently, the measure, having the implied support of the White House is likely to have strong backing in the Senate. A similar measure is expected to be introduced in the House by Representative Scott of Michigan, chairman of the House Committee on Merchant Marine and Fisheries. Mr. Scott is also expected to sponsor a measure providing for the consolidation in the Department of Commerce of various bureaus having to do with shipping affairs which are now scattered among other departments.

Emergency Fleet Changes.

Incidentally, the path for reorganization of the Fleet Corporation on the proposed new basis has been cleared by the resignation of Asa F. Davison, W. B. Keene, Joseph E. Sheedy, Hutch I. Cone, and Sidney Henry as vice-presidents of the body.

On the other hand, it must be admitted that the record of the Board during the past few months in eliminating unnecessary expenses of administration and disposing of established services and individual ships either for operation or for scrapping has furnished the basis for a strong argument in favor of retention of the present system, regardless of the controversies which have arisen over certain sales.

The Chairman of the Board has recently adopted a policy of asking critics of the Board's policies to offer definite suggestions for getting the government out of the shipping business, but states that his efforts in this direction have thus far been unsuccessful. He stands ready to produce facts and figures to show just what the Board has done and is planning to do and is giving his critics a chance to show what they are doing to aid in the maintenance of the American merchant marine. This aggressive policy is winning many supporters.

Shipping Board Sales.

During the past year four important lines have been sold, the American Palmetto line, operating six ships, the Pan-America line, operating four ships of the "President" type, the American Export line operating eighteen high-class freighters in the Mediterranean trade, and the California Orient line, operating five "President" ships. The purchasers of each of these lines are already seeking to purchase additional tonnage. Since 1921, the Shipping Board, according to Chairman O'Connor, has disposed of some 1300 ships, of which 800 are being operated under the American flag, the others having been sold for scrapping. Several additional lines are expected to be disposed of in the near future, thus hastening the process of retiring the government from the shipping business.

These include the American Oriental Mail Line, on which new bids have just been asked; the Pacific-Argentine-Brazil Line, on which a new and very promising bid has been made lately; the American Republics Line, operated by the International Freighting Corporation, on which both the Munson and Barber lines are expected to submit bids; and the South and East Africa service operated by the Bull Lines, for which the Barber Line, formerly operating in this trade, are reported to have put in a bid.

Preferential Duties Again.

Preferential import duties and tonnage dues for American ships have been advocated once more in a bill introduced by Representative Fairchild of New York. This measure provides for an extra duty of 5 per cent ad valorem on goods brought into the United States in other than American vessels and would impose tonnage dues of 6 cents per net ton on vessels of American registry entering American ports, 30 cents

(Continued on Page 34, Adv. Sec.)

Pacific Port Construction Program

Victoria's Marine Development in 1926

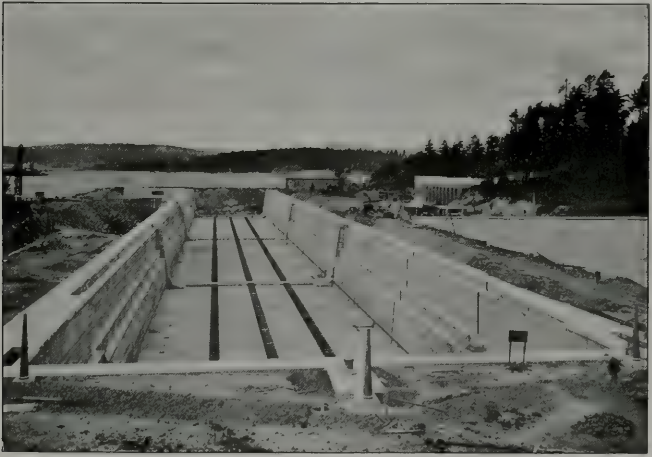
IT would appear to be assured that port and other marine developments will keep pace during 1926 with the general industrial expansion now apparent in Victoria, the capital city of British Columbia and the first and last port of call for all vessels entering or leaving Puget Sound or the Gulf of Georgia. In fact, each of Victoria's three harbors will benefit to a very great extent during the coming twelve months.

View of Victoria's Inner Harbor showing number of British Columbia coastal vessels at dock

Three major developments are now either under way or assured for the Ogden Point Ocean Docks, one of Victoria's deep-water harbors. The Canadian Government is organizing there a lumber assembly plant capable of handling the whole lumber cut of Vancouver Island and which will make Victoria the lumber export port. Also, a million-bushel grain elevator is to be built by Regina business men and Saskatchewan farmers and will be ready to handle the 1926 wheat crop. Arrangements for the building of two other elevators are at the present time under advisement, and it is confidently believed at least one will be brought to a successful conclusion.

The Inner Harbor, the home of the big Canadian Pacific Railway coastal fleet of steamers and other coastwise craft, and on which some of Victoria's biggest foreign export lumber mills are situated, is being extensively dredged and deepened, and some rocks that have in the past been a hindrance to shipping are being blasted out. Also, some of the lumber mills and wholesale firms facing the Inner Harbor are extending their wharves so as to expedite the transportation of their products, for which they are finding a quickly-increasing market.

During the Great War the Dominion Government of Canada decided that, for strategic and mercantile reasons, it was necessary to have a drydock on the Pacific Coast big enough to take the largest ship afloat. After careful survey and consideration, Victoria was chosen as the obvious site; and the building of a huge drydock in Esquimalt Harbor, Victoria, was commenced in 1921. This giant basin, hewn out of the living rock, has cost approximately $6,000,000 and measures 1150 feet long, 149 feet in width at the top, 126 feet at the bottom; its depth is 49 feet 5 inches, with 40 feet of water on sills at high water. The dock will take any ship afloat, or if desired, can be divided into two sections of 400 feet and 750 feet respectively. It is lined with concrete, with granite coping, altars or steps, granite keel and bilge block seats, and is equipped with four caisson berths of granite.


View of the great drydock at Esquimalt showing the basin empty. This dock will be opened for service early in 1926. It is the second largest graving dock in the world.

The dock is to be finished early in 1926. There is only one larger dock in the world, and that is the Commonwealth Drydock at Boston, Massachusetts, which is 29 feet longer. The dock will be operated electrically. There are three 54-inch main pumps and two 22-inch auxiliary pumps, which empty the dock in four hours. The water is pumped out into the sea through a 600-foot tunnel measuring 9 feet by 14 feet. When filled, the dock contains 42,000,000 gallons of water.

The Port of Tacoma has Rapid Growth and Expansion

Ranks High Among Ocean Terminals of the Pacific Coast World Service Maintained from its Piers

THE Port of Tacoma, a municipal corporation co-terminus with Pierce County, State of Washington, was organized in 1918 and started operations in the year 1921. Since that time the piers have had a very rapid growth in the handling of lumber and general cargo commodities, lumber shipments increasing since the first year of operation by 760 per cent; general cargo 710 per cent; ships bringing inbound cargo 660 per cent; ships taking outbound cargo 650 per cent; and an increase in railroad cars received at its terminal 550 per cent.

Port Property.

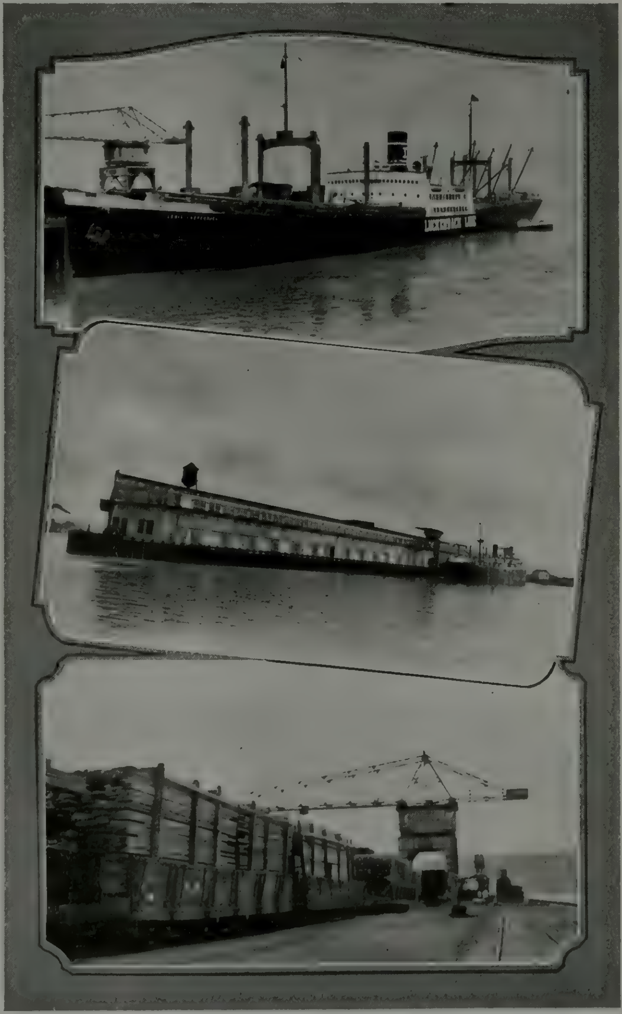
The property owned by the port is on the east side of Commencement Bay, 150 miles inland from the open sea and lying at the head of navigation for transcontinental and trans-Pacific traffic. Land-locked and protected alike from the sweep of currents and of prevailing winds, the harbor is classed as one of two in the United States which can accommodate vessels of any draft, being further admitted one of the world's five great harbors. The site of the terminal consists of two hundred and forty acres, being nearly in the form of a square with dimensions of approximately three-quarters of a mile. In addition to this acreage, there is contiguous thereto and situated on the deep water frontage of the tract a state harbor area 600 feet in width, which is leased from the State of Washington, this area adding approximately forty acres to the site owned outright by the port.

Comprehensive Plan.

Port development plans provide for waterways on each side of the property, 800 feet in width with slips leading therefrom at angles of 45 degrees, being 300 feet in width and 1200 feet in length, with piers between the slips varying from 250 feet in width up to 674 feet and 1200 feet in length. Dividing the piers and slips are the railroad storage tracks, roadways, water mains, and power lines serving the different piers. For the purpose of construction there has been voted and is now outstanding $2,500,000 of bonds.

Piers.

At the present time the port has in operation two piers, one for open storage and one for covered storage. Pier No. 1, the open storage pier, is 166 feet wide and 1200 feet long with ship's side and crane tracks at the dock level. This pier is the open type construction of creosote piling and timber deck, adequately protected from fire by hydrant and hose service, together together with steamer and fireboat connections. Pier No. 2 is 674 feet wide by 1200 feet long and is designed for a combination unit, with



Three views of Portacoma Piers showing facilities for loading and unloading steamers.

transit shed on either side 180 feet in width and 1040 feet in length, between which is to be located a multiple storage warehouse, together with a cold storage plant. At the present time one transit shed is constructed and in operation, being of the open and filled type with 35 foot apron on the slip side of the shed, carrying two standard gauge railroad tracks and a crane rail at the dock level. In the rear of the shed are depressed tracks for car level trucking. The substructure of the shed consists of gunite piling out to the building line, with creosote piling beyond this and under the track apron. The superstructure is of timber throughout with the exterior wall constructed of gunite. Adequate fire protection is provided for this shed by a two-supply automatic sprinkler system, together with chemical and hydrant equipment. The storage capacity of Pier No. 1 is 15 million feet board measure of lumber, and contiguous thereto is ground storage with capacity of 35 million feet board measure. Transit Shed No. 1 on Pier No. 2 has a general cargo capacity of 45 thousand tons.

The ultimate development of this project will consist of six 1200 foot piers capable of berthing fifty vessels with a water depth throughout of 35 feet at low tide.

Equipment.

Pier No. 1 is equipped with two hammerhead type cranes of 5-ton capacity at 90-foot radius. In addition to these two cranes, there is another one of similar design and capacity located on the ground storage adjacent to this pier; the three cranes having a capacity of some million and a half feet per day from movements into storage and to ship's side. Standard gauge railroad tracks are located through and under all cranes, which tend for quick dispatch in unloading cars without interference of cars moving directly at ship's side.

Pier No. 2 is equipped with two semiportal wharf cranes of 3 to 5 tons capacity, so designed as to work directly from ship's holds without interference of ship's rigging. These cranes transfer cargo to an overhead monorail system throughout the shed with electric carriers of 3-ton capacity, having a speed of 800 feet per minute, which enables rapid handling of cargo direct from ship's hold to place of rest in the shed and vice versa.

Railroad Service.

The port is served by four transcontinental railroad systems, including the Chicago, Milwaukee & St. Paul Railway, the Great Northern Railway, the Northern Pacific Railway, and the Union Pacific system.

Insurance.

Due to the type of construction employed, together with complete tour and fire alarm service and the employment of watchmen at all times, the port enjoys a very low insurance rating, as follows:

Pier No. 1, open storage, structure and contents	$1.15
With 90% R.R.A. clause, structure and contents	.92
Transit Shed No. 1, Pier No. 2, structure and contents	.57
With 90% R.R.A. clause, structure and contents	.31
Lumber storage yard	1.39
With 90% R.R.A. clause	1.25

These rates, together with low storage charges, make a warehousing medium of exceptional attraction.

Industrial Sites.

The Port of Tacoma has a considerable portion of its property available for long time leases in connection with manufacturing and other industrial purposes. These tracts are exempt from all taxes and the yearly rental is based on 6 per cent of the actual cost of the improved land. These tracts are served by a Belt Line Railway, connecting with the four transcontinental railroads, and are adjacent to paved highways, water and power facilities, with an industrial power rate lower than at any other point in the United States.

Bulletin.

A bimonthly bulletin service is maintained by the Port of Tacoma showing complete sailing schedules of all steamship lines making its piers. A written request will place anyone on the port mailing list for regular distribution of this bulletin and any special or detailed information regarding rates, services, and industrial sites will be gladly furnished on application.

Organization.

The Port of Tacoma, commonly known as "Portacoma Piers," is created under the laws of the State of Washington, being governed by three Commissioners, each serving for a term of three years and elected to office by a combined vote of Pierce County, which is the district. The personnel of the commissioners at the present time is: Chester Thorne, president; Capt. W. Frank Andrews, secretary; and Charles W. Orton, commissioner; under whom serve by appointment, executive officers consisting of a manager and chief engineer, traffic agent, auditor, and counsel. The port, through its various departments, aids shippers by obtaining for them, upon

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An aerial view of Portacoma piers.

Port Progress at Portland

AS EARLY as 1850 sailing vessels began ascending the Columbia and Willamette Rivers to a village known as Portland, situated more than 100 miles from the Pacific Ocean. These were followed later by monthly and weekly steamer service with San Francisco. In the late sixties and early seventies vessels of other nations began regularly to call at the Port of Portland for the products of the territory tributary to Portland, mostly grain and lumber, and this was done despite the unfavorable state of entrance and ship channel conditions in existence at that period.

The new McCormick Terminal at Portland.

Federal Aid.

The Federal government, realizing the importance of furnishing a safe and convenient outlet of the products and resources of the great Columbia basin of more than 200,000 square miles in area, which was being rapidly settled and developed, in 1866 began the work of improving the ship channel to the sea. In 1885 the first appropriation for the improvement of the mouth of the Columbia River was made, the work being completed in 1917.

Columbia Bar Eliminated.

The completed improvements have resulted in an entrance depth of 46 feet at low water, where used to be the old Columbia River bar with its 20 feet low water depth. In the ship channel between Portland and the sea a depth of at least 30 feet at low water is always maintained, with tides at Portland varying from two to four feet. The adoption of a ship channel project depth of 35 feet at low water is now before the War Department for approval.

Public Dock Commission.

Prior to 1912 all of the port facilities were privately owned and operated, but in 1910 Portland, in keeping with other Pacific Coast ports, made preparations to enlarge its port facilities to care for the increased ocean commerce expected on account of the opening of the Panama Canal, as well as for the increased traffic due to the development and expansion of its tributary trade territory. In the latter year, the Commission of Public Docks was created for the purpose of providing modern facilities for the economical and expeditious handling of this commerce, which called for more diversified facilities than those then in existence—mostly cereal and lumber docks.

Municipal Terminals.

Since 1912 the Commission of Public Docks has constructed four terminals, which have a value of about 12 million dollars, with berthing space for eighteen vessels of the largest size. At these four terminals the Commission has a total area of 233 acres, thus permitting of a large expansion of its shipping facilities when needed.

Terminals Nos. 1 and 4 are the most important. At Terminal No. 1, with five berths, are handled intercoastal and European cargoes, while Terminal No. 4, with berthing space for eleven vessels, is used nearly exclusively for foreign and transshipping business. At Terminal No. 4 there have been provided special facilities for the handling of diversified cargoes such as elevator for grain, ventilated and cold storage for apples, tanks for vegetable oils, large bunkering plant for coal, zinc, ore concentrates, manganese ore, phosphate rock, etc., storage for lumber, for flour, direct transfer of commodities between ship and car and vice versa. In addition to the above, there is a terminal trackage of about 15 miles, joint agency of all the railroads centering in Portland, a fumigating plant, and a flour mill.

Present indications of additional facilities necessary to provide for the increasing waterborne commerce of the port during the ensuing years will be the construction of a lumber pier, with gantry cranes, at Terminal No. 4, 1500 feet long and 310 feet wide, Pier No. 4, and a pier at Terminal No. 1, 569 feet long and 218 feet wide, Pier C. The dredging and fill for these piers have already been completed, so that actual construction can be proceeded with without delay. While

Piers A and B, Municipal Terminal No. 1, Portland.

this will be the major new construction to be undertaken, there are many other and minor betterments or improvements on which funds will be expended during the year.

Privately Owned Terminals.

Private interests have developed more than three miles of the port's waterfrontage, which is being used in connection with shipping. These facilities consist of general cargo, grain, lumber, and fuel docks, the McCormick Terminal, 1071 feet long, being the latest addition. At this time it seems likely that some private waterfront construction will be undertaken in 1926, but the extent of same is not known at this time.

Doors for England.

An interesting shipment made from Portland in the middle of December, 1925, was that of 34,880 doors for London and Liverpool on the Noorderdyk, of the Holland-America Line. It is classed as a record by the traffic department of the Port of Porland Commission. Allowing twelve doors to the ordinary small bungalow, this would be sufficient for nearly 3000 houses.

The Port of Tacoma has Rapid Growth and Expansion

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request, accurate information concerning sailing schedules, freight rates, and general shipping conditions; and due to its close contact with the many steamship lines calling at its piers, it is in a position to act for shippers in the booking of steamer space for cargo to all world ports. This service is of great help to shippers, especially those located at inland points, as it relieves the shippers of the bother of dealing with a number of steamship lines and offers them an opportunity to obtain the next available sailing for a desired port at a minimum of time and labor on their part. The port issues a tariff covering fully all charges assessable over its piers, and these will be gladly mailed on request as well as sailing schedule bulletin and other shipping information.

Private Terminals.

There are, in addition to the Portacoma Piers, several private terminals in operation on Tacoma harbor, including the Chicago, Milwaukee & St. Paul Railway; Oregon-Washington Railroad & Navigation Company; Northern Pacific Railway Company; Balfour, Guthrie & Company; Shaffer Terminals; Baker Dock Company; and Commercial Dock Company; all of which have excellent facilities for the handling of ocean commerce. In addition to these docks, there are several docks in operation by sawmills located on tidewater as well as docks operated in connection with various flour mills.

Upper left shows Slip No. 1 of Portland Municipal Terminal No. 4 with five vessels working cargo and another entering slip. Lower left shows vessels taking bulk wheat at Pier No. 1, Municipal Terminal No. 4. Upper right, a tanker discharging coconut oil at Pier No. 2, Municipal Terminal No. 4. Lower right shows a steamer taking a cargo of zinc concentrates from bulk storage.

New Floating Fire Fighter

LOS ANGELES CITY No. 2, first of two fireboats building at the Los Angeles Shipbuilding & Drydock Company for the fire protection of Los Angeles harbor, was recently completed, and after highly satisfactory tests delivered to the city. These boats, with their equipment, were described and complete plans published in the August 1915 issue of Pacific Marine Review. For the convenience of our readers we here reproduce part of the articles then published, together with a number of fine illustrations of equipment and of the boat in action.

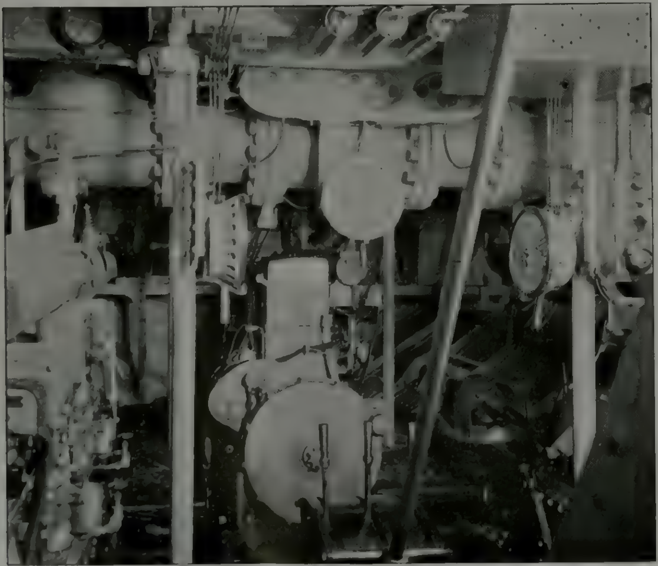
Fireboat Los Angeles City No. 2 throwing 12,000 gallons of water per minute on 200 pounds pressure.

The vessel was designed by L. E. Caverly, who was appointed consulting naval architect for the city of Los Angeles, in colloboration with Ralph J. Scott, chief engineer of the fire department of the city of Los Angeles, and the design includes many novel features in fireboat construction.

In order to keep dimensions as small as possible for rapid maneuvering in restricted spaces and to obtain the maximum water delivery and speed with a minimum of standby expense, all the power required for propulsion and pumping is developed by gas engines direct-connected to propellers and centrifugal pumps.

The hull is of steel throughout, with the exception of fenders, which are of wood, and special precautions have been taken to limit fire hazard to the vessel itself. The principal dimensions are as follows:

Length over-all	99′ 0″
Length bet. perpendiculars	93′ 4″
Beam molded	19′ 0″
Beam over guards	20′ 4⅜″
Draft, mean	6′ 6″


Control stand in engine room of fireboat Los Angeles City No. 2.

The hull is subdivided by three transverse watertight bulkheads forming a forepeak, forward hold, machinery compartment, and afterpeak, all bulkheads extending to the main deck, which is of steel for the full length of the vessel. The deckhouse contains a raised pilothouse, a nozzle and equipment room, a galley, and a toilet. A raised dome is provided over the after end of the machinery compartment and a companion way is located forward for access to the fore hold and to the forward end of the machinery space.

Fire Fighting Equipment.

The fire fighting equipment consists of five monitors, one located on the main deck forward, one on top of the pilot house, two on the main deck aft, and one on top of an electrically operated telescopic water tower having a maximum elevation of 44 feet above the water line. Each monitor is capable of delivering 3000 gallons of water per minute. There are two hose manifolds on the main deck, one on each side of the dome over the machinery compartment, each having twelve connections for 3½-inch fire hose. There is also a Foamite set of 300 gallons capacity this equipment being located on top of the dome over the machinery space.

Fire hose is carried on four reels, one in the fore hold having a capacity of 1500 feet of 3½-inch hose, two swiveling reels on the main deck, each holding 1000 feet of 3-inch hose, and one swiveling reel on the main deck holding 1000 feet of 3½-inch hose. Stowage is provided in the deckhouse for an assortment of nozzles, an oxy-acetylene burning outfit, diving apparatus, smoke helmets, and miscellaneous fire-fighting equipment.

Both electric and hand steering gear are provided, and the vessel is electric lighted throughout. A hand-operated capstan is provided on the main deck forward for handling lines and anchor cable.

Fuel is carried in separate steel tanks located in the fore hold and after peak compartment. A water screen of perforated pipe is carried around the top of the deckhouse and under the upper fender to protect the vessel when operating close to a fire.

Power Plant.

The power plant consists of seven

Winton gas engines, each of 300 brake horsepower and two Winton engines, each of 25 brake horsepower. One of the 300 brake horsepower engines is located on the center line aft and drives the center propeller. Two of the 300 brake horsepower engines are located aft to drive the wing propellers and after fire pumps, cut-out couplings being provided so that these engines can be used for driving the propellers when proceeding to or from a fire, and for driving the after fire pumps at the scene of the fire. Four of the 300 brake horsepower engines are direct-connected to the forward fire pumps.

This arrangement provides a total of 900 brake horsepower for propulsion when proceeding to or from a fire, giving the vessel a speed of 17 miles per hour, and the center engine of 300 brake horsepower is available for maneuvering at the fire when the remaining engines are on pumping service.

The two 25 brake horsepower Winton engines are direct-connected to two 15 kilowatt generators, one of which provides all the electric power required for the steering gear and other auxiliaries, the other being in reserve.

Pumping Plant.

The pumping plant consists of six Byron Jackson 4-stage centrifugal pumps, entirely of bronze, each having a capacity of 1700 gallons per minute at 200 pounds discharge pressure, giving a total delivery of 10,200 gallons per minute. Each pump draws from a separate sea suction and discharges through a check valve into a discharge header circuit, which supplies the monitors and manifolds on deck. Hydraulically operated valves are provided in the discharge line from each pump and at the base of each deck monitor. There is also a motor-driven bilge pump and air compressor, the latter being used for operating an air whistle.

Special provision has been made for the ventilation of the machinery compartment and the prevention of the accumulation of gas vapors in this space. Fuel is carried in well ventilated spaces forward and aft of the machinery compartment, and fresh air is admitted into the engine room through ventilator cowls and louvers under the pilot house floor.

There are two motor-driven exhaust blowers located under the main deck abreast of the engine hatch, these blowers drawing through steel ducts from the vicinity of each gas engine and switch board and discharging through ventilators above deck. These blowers have sufficient capacity to change all the air in the machinery space every five minutes.

As a further precaution, a drip pan is provided under each engine to collect any gasoline or lubricating oil, with drains to a well ventilated closed tank under the engine room floor. This tank is connected to the bilge pump and the contents may be pumped overboard as found necessary. The tailshafts of these vessels are fitted with Goodrich "Cutless" rubber bearings. These tough water-lubricated journals of olivite rubber are rapidly gaining favor with ship operators. They solve stern tube problems better than any other available form of bearing.

On trial the Los Angeles City No. 2 performed admirably, exceeding specifications in every particular. She is now in regular service, protecting the valuable floating and waterside property of the great harbor of the Greater Southwest.

Fireboat Los Angeles City No. 2 throwing 16,000 gallons of water per minute at 150 pounds pressure.

Trade Literature

A line of speed reducers for use with standard or high speed motors driving slow or moderate speed machinery, including worm reduction gears of the horizontal and vertical shaft and double reduction types, also helical gears for low ratios, and double helical gears for high power service, are described in a 16 page booklet published by the **De Laval Steam Turbine Co.**, of Trenton, New Jersey. The illustrations include many colored views, which clearly set forth the details of construction, materials used, the pressure oiling system for heavy duty service, etc.

A convenient chart for the use of engineers who have occasion to calculate quantities connected with the expansion of steam is being distributed by the **De Laval Steam Turbine Company**, of Trenton, New Jersey. The well known Mollier diagram is printed upon a stiff sheet of Bristol board, attached to which is a scale which can be broken off and used directly for measuring heat available, spouting velocity, pounds of steam per horsepower hour, and duty between given pressure limits on the entropy diagram; that is, the chart and scale give these quantities directly for a perfect heat motor. If the steam consumption of an actual engine or turbine is known, the efficiency ratio is found by a simple division. The quality of the steam at the end of a perfect expansion or at the end of actual expansion of known efficiency or steam consumption is also read off immediately from the chart. Copies will be sent upon request.

Japanese Industrialist Discusses Eastern Shipping

LUMBER, wheat, and oil were the main topics of interest to Mr. Kyohei Kato, managing director of the Mitsubishi Company of Japan, who was a visitor to the Pacific Coast during December. Mr. Kato represents a company engaged in the Island Empire in shipbuilding and repair, coal mines, metal and machinery manufacturing, banks and insurance. Besides these enterprises, one of the chief subsidiary companies of the Mitsubishi holding corporation is a trading organization known as the Mitsubishi Shoji Kaisha. This company exports silk and other commodities from Japan and imports large quanties of wheat, lumber, oil, foodstuffs, and manufactured goods from the United States and other countries.

Accompanying Mr. Kato on his tour of the Pacific Coast was Mr. Shimatani, manager of the Seattle office of the Mitsubishi Company. Mr. Shimbatani reports that he shipped to Japan from Canada last year more than one hundred thousand tons of wheat.

"The Japanese people," says Mr. Kato, "are no longer able to grow enough rice so that the poorer classes can afford to use it as a principal article of diet. As yet, we have comparatively few flour mills in the islands, so our people are grinding the whole wheat and using it without much milling."

From both Oregon and Washington the Mitsubishi Company are sending large shipments of lumber to the islands. The rebuilding of the sections destroyed during the recent earthquake and fire is progressing at a very satisfactory rate. This is due in part to the fact that the government is extending to the people loans at low rates of interest, with long-term payments. Building and loan associations have also been organized by Japanese capitalists which loan money on very easy terms to builders both of industrial and of residential property. Mr. Kato anticipates a possible gradual increase in the price of lumber in the islands, due to the growing scarcity of all kinds of timber in Japan.

While on the Pacific Coast, one of Mr. Kato's first interests was the investigation of our methods of producing, refining, and distributing petroleum. A few months ago the Mitsubishi Company became distributors in Japan for the Associated Oil Company. Mr. S. Akazawa, who is traveling with Mr. Kato, will be manager of white oil sales for the Mitsubishi Trading Company.

Above, Mr. Kyohei Kato, managing director of the Mitsubishi Company of Japan, who is touring the Pacific Coast in the interests of his firm. Below, Mr. Kato and H. Akazawa, manager of white oil sales for the Mitsubishi Company, are being shown the process of unloading Associated Oil tanker Wm. F. Herrin at the distributing plant of the Associated Oil Company, Seattle. W. A. Reanier, Seattle district agent of the Associated Oil Company, is pointing out the interesting features of the plant.

While in San Francisco, Mr. Kato was entertained at luncheon, with a group of prominent San Francisco business men, by A. C. McLaughlin, vice-president of the Associated Oil Company. In reply to a statement by Mayor Rolph of San Francisco to the effect that Californians generally are extremely anxious to promote better industrial relations with Japan and are particularly desirous at this time of expressing their willingness to cooperate in every way toward building up better trade agreements, Mr. Kato said in part:

"Perhaps our Japanese politicians would not agree with me. Nevertheless, it is true that our business men and most of our educated Japanese people realize that emigration to the United States can never solve our difficulties. The population of the islands is increasing at the rate of more than seven hundred thousand annually. The few thousands who come to the United States do not relieve us at all.

"What Japan must do is to build up more trade and more manufacturing. We have the same kind of trouble, due to congested population, that the British Isles face. We must help ourselves by stimulating trade and manufacturing for consumption at home and in the Orient.

"I am especially interested in building more good roads in Japan. Perhaps it is a slight exaggeration, but I am safe in saying that we have no good roads. Our business men now realize that good roads must be built. As fast as our highways are extended, we will buy many more automobiles, and naturally our people will desire other western commodities as soon as we begin to get better transportation.

"I look forward with great enthusiasm to building a steadily increasing trade between the ports on the Pacific Coast and Japan. We must not let our people do anything which would interfere with the success of our trade relations. If shipping and trade prosper, both our people and yours will be happier, and most of our present troubles will disappear."

Marine Oil Engine and Motorship Progress

Equipment on Motor Tanker Lio

Lux Fire Extinguisher System

ADEQUATE fire protection is a very necessary feature of tanker design. Particularly is this true on tankers carrying bulk gasoline. With steam tankers, steam is used to smother fires but with diesel engine propulsion some other agent must be found. When, therefore, the marine department of the General Petroleum Comporation undertook to convert the tanker Lio from steam to diesel propulsion, and for bulk gasoline carriage, the question "What system shall we use for fire protection?" immediately became paramount.

After a thorough survey of existing systems, an order was placed with Hough and Egbert, California representatives of Walter Kidde & Company, of New York, for the installation of a Lux carbon-dioxide system covering practically the entire vessel.

This installation, now completed and ready for final test on the ship, includes 10 cylinder banks of 10 cylinders each, with an elaborate system of manifold valves, piping, and nozzles reaching every part of the vessel at all subject to fire hazard.

The cylinder installation is located on the upper deck under the bridge superstructure. From this point pipes run forward and aft to the various spaces covered by the system. These pipe lines are installed with great care, as they have to carry liquid carbon-dioxide at high pressure and deliver it at specified points of outlet ready for release and instant change to gas. One cubic foot of carbon-dioxide on release becomes 450 cubic feet of gas.

In the Lux system a number of charged cylinders, known as a bank of cylinders, are connected together by a manifold. Each cylinder is separated from its manifold by a thin diaphram or frangible disc; and each cylinder is equipped with a cutting attachment worked by a lever, so that a movement of the lever through a short arc instantly releases the contents of cylinder into the manifold. These levers are connected throughout each bank of cylinders so that there is simultaneous release of any one bank.

The ten banks of cylinders installed on the Lio cover the ship with fire protection in the following manner:

The manifold of Bank No. 1 is connected by $1\frac{1}{4}$-inch, $\frac{3}{4}$-inch, and $\frac{1}{2}$-inch pipe directly to cargo oil tanks No. 1, port and starboard, and to summer cargo oil tanks No. 1, port and starboard.

Bank No. 2 leads to four cargo oil tanks Nos. 2 and 3, port and starboard.

Bank No. 3 takes care of cargo oil tanks No. 4, port and starboard, and summer cargo oil tanks No. 2, port and starboard.

No. 4 bank protects four cargo oil tanks, Nos. 5 and 6, port and starboard.

Banks Nos. 5, 6, 7 each take care of four tanks completing the coverage of cargo.

So complete is this system that it is claimed any gasoline tank fire on this ship can be brought under control almost instantly.

Bank No. 8 covers the fuel tanks under the machinery space aft as well as the fuel and lubricating oil storage in the cofferdam aft.

All eight of these banks are arranged in pairs in four fore and aft lines on starboard side on upper deck under bridge superstructure.

Banks Nos. 9 and 10 are arranged thwartship, just forward of the other banks of cylinders. These two banks are arranged to deliver into a 2-inch header from which a 2-inch line runs aft to engine room, a $1\frac{1}{2}$-inch line runs aft to pump room, from which a 1-inch line continues aft to take care of refrigeration machinery space and engine-room paint locker. From the aforementioned 2-inch header there run forward a 1-inch pipe with connections to cargo hold and 'tween deck space, carpenter shop, paint locker, boatswain's stores, lamp locker, forward cofferdam, and lower storeroom.

Thus every fully enclosed space in the hull is entirely covered by the Lux system, and 5000 pounds of liquid carbon-dioxide is available instantly to smother any threatened conflagration before it reaches danger point.

Installation of Lux system carbon-dioxide cylinders and manifold on the General Petroleum motor tanker Lio.

Ramsay Anticipating Governor

OVERSPEED and emergency governing of marine oil engines is accomplished by modifying the action of the fuel pump. Owing to the small size of the individual fuel charges which are pumped, light simple mechanisms can be employed and a stoppage of the fuel instantly deprives the engine of the energy supply which is necessary for over-speeding. In the case of a triple expansion steam engine the vacuum as well as the steam present in the intermediate piping and receivers does not come under the control of the throttle, with the result that it cannot be stopped nearly so promptly. Precise regulation can be secured for the diesel engine with considerably greater ease.

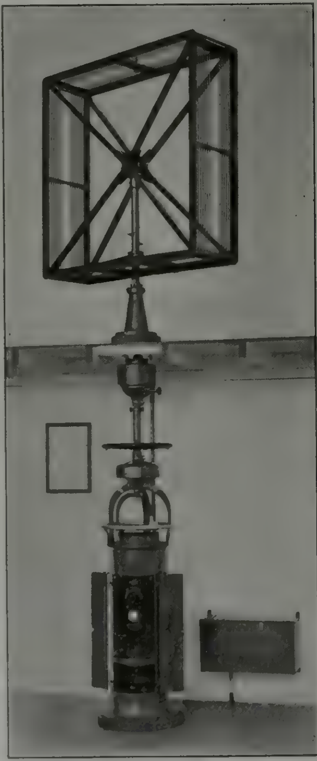
Among the most interesting of the speed-regulating devices that have recently been perfected for guarding against dangerous speeds at sea is the Ramsay governor.

This mechanism is actuated by an adjustable weight which is oscillated by means of springs and a bell lever drive taken from the fuel pump gear or other part that reciprocates in unison with the engine. If a rise in speed occurs, the swing of the weight becomes sufficient to actuate both of two tappet screws that limit its travel. Since the screws are attached to a valve, any displacement of which from the central position causes a flow of air in the tube on which it is located, it is plain that an air pressure impulse will be set up in the tubing at each blow from the weight. Air for this purpose is taken by means of a valve reducing to 25 pounds per square inch from some permanent source of supply such as starting air.

Air pressure is thus communicated to a small cylinder containing a piston attached to the fuel cut-out mechanism on the fuel pump. A small spring loaded pilot valve first allows a fraction of the air impulse to escape to the atmosphere, but in doing so it moves to the left and automatically closes the atmospheric vent. The rest of the air impulse spends itself in moving the piston and thereby interrupting the fuel supply, after which the spring on the pilot valve returns the latter to the vented position and allows the air in the system to escape. Owing to the fact that the small spring is under the control of a hand screw and jam nut, it can be set in such a way as to give the proper travel to the piston.

Should the weight strike a particularly heavy pair of blows, more air is allowed to pass, the piston rises higher and catches under the pawl shown on the outside. This is what would happen if the propeller should come loose or the shaft should break. The complete stoppage of the engine would give warning to the operators and would effectively prevent the machine from "running away." For ordinary racing conditions due to a variation in load such as may be caused by a following sea, the double air impulses accompanied in each case by an automatic return of the piston are sufficient to maintain practically normal speed.

The most noteworthy feature, by virtue of which excessive speed fluctuations are prevented even from arising, consists in the anticipating valve shown near the top of the line drawing. When the vessel pitches forward preparatory to thrusting the propeller out of the water, the ball on the balance-lever valve, which is mounted in a fore-and-aft position and which may be adjusted to any trim of the ship, rolls to one end and admits air to the piston irrespective of the position of the inertia weight. When the ship rights herself before reimmersing her wheel, the ball rolls back and the vent-valve allows the piston to come back and to reestablish the fuel supply even before a serious drop in speed has occurred. Excessive speed fluctuations are thus eliminated and the possibility of making better mileage even in the face of heavy weather is considerably enhanced.



A Ramsay governor has been installed on the Bethlehem diesel engine of the General Petroleum tanker Lio, and this description is published through the courtesy of L. M. Laylor, manager of the San Francisco district for Chas. Cory & Son, Inc., who distribute this efficient governing device in the United States.

Federal Telegraph Equipment

THE motorship Lio, belonging to the General Petroleum Corporation, has recently been equipped with the very latest type of Kolster radio compass, and also with a new radio time-tick system. Both installations were made by the Federal Telegraph Company.

Several new features are included in the new late model Kolster compass, chief among which is the illuminated dumb-compass card, designed to facilitate the taking of radio bearings at night. Facilities are also provided so that two persons may listen in at the same time. This arrangement is ideal for giving instructions in the use of the radio compass.

A Sperry repeater was also installed on board the Lio in conjunction with the Kolster compass. All radio bearings taken will be direct reading, requiring no corrections.

The equipping of the Lio with these devices marks the completion of Kolster radio compass installations on the entire General Petroleum' Corporation's fleet. All of the other vessels of this fleet have been using this equipment for some time past, the motorship Lio being a recent acquisition.

The Lio is also equipped with Federal C. W. marine radio apparatus capable of reliable communication over long distances both day and night.

* * *

Cylinder Lubrication

ONE of the most important factors in the successful operation of diesel engines is effective and properly timed lubrication of the cylinder walls. In the Bethlehem engine this is accomplished through the use of a force feed lubricator, especially designed for this engine by S. F. Bowser & Company, Inc.

Each of the six cylinders is equipped with a three-feed model M. G. & O. force feed oil pump which differs from standard model M in that the pump body contains a double row of plungers, the front set of which operates to force the oil into the discharge line, and the rear set operates tapped valve stems in the air spray attachment to the discharge connections.

These air sprays are connected to a compressed air line, which is opened into the oil discharge line by the operation of the valve stems above mentioned, thus forcing a charge of compressed air through the port to the air connection on the terminal check valve, so that upon the opening of the terminal check valve the oil is atomized as it passes into the cylinder.

By adjustment of the driving mechanism through the lever stroke the discharge of oil may be timed to synchronize with the piston stroke of the engine; while the length of time the air valve is open is governed by the stroke of the valve, which in turn is regulated by the tappet screw in the top of the plunger.

The pump bodies are machined from a solid block of gray iron; the gear shafts and plungers made from cold rolled steel; while the air valve stem is made of monel metal, the body of cast iron, with cap and stuffing box of steel. This combination of sturdy construction with high grade metals makes it possible to guarantee efficient service and a life at least as long as that of the engines which are served.

Errata

On page 461 of the October issue of Pacific Marine Review there was shown an illustration of the warping winch on the Atlantic Refining Company's motor tanker J. W. Van Dyke. In the caption describing this picture the winch was erroneously credited to the Hyde Windlass Company.

This winch should have been described as the Lidgerwood Manufacturing Company's triple-geared warping winch arranged for electrical operation. Apology is hereby tendered to the Lidgerwood Manufacturing Company for this error. The winch in question has been giving very excellent service on the J. W. Van Dyke and is in every way satisfactory to the owners of the vessel and to the operating personnel.

LOS ANGELES HARBOR.

The harbor of Los Angeles is, perhaps, the fastest growing port in the world. The two views shown here feature a small part of the progress that has been made during the past fifteen years. Above is shown the lumber wharf which constituted practically the entire improvements of the port of Los Angeles in the year 1910. At the left we have an aerial view showing the recent appearance of the port development. The improvements shown are those directly contiguous to the entrance channel and the inner harbor. The flat ground in the upper righthand corner is all to be improved with large piers and slips as soon as the improvements now pending on the outer breakwater have been finished. In combination with the city of Long Beach, Los Angeles will then have as fine an artificial harbor as any in the world.

Auxiliaries for Motor Vessels

AT the recent annual meeting of the American Society of Mechanical Engineers a very instructive and interesting paper on the subject of auxiliaries for motor vessels was presented by John W. Morton and A. B. Newell. Morton is the engineer in charge of the diesel department and Newell is the guarantee engineer, both of the New York Shipbuilding Corporation. We give here the introductory part of this paper dealing with the general comparison between steam and electric power for auxiliaries.

Due to variations in types of ships and propelling engines, the necessary auxiliaries vary to such an extent that standardization is almost impossible. This of course does not mean that within the machinery itself or in its component parts standardization is impossible, as manufacturers are striving today more than ever to standardize their products as much as possible, greatly to the benefit of shipowners and operators. But auxiliaries on board a ship will vary according to the character of the ship's service, whether tramp, passenger liner, tanker, barge, towboat, dredge or pleasure vessel. Each ship is likely to have a different kind of installation. The mode of drive, whether direct, electric, hydraulic, or gear-transmission, and whether or not the ship is new or converted are factors influencing the installation.

To the shipowner who has decided to install diesel engines as the propelling unit in his vessel, the selection of suitable auxiliary machinery is a question worthy of special consideration and presents greater difficulties with oil-engined vessels than with steamers. With the latter, either the donkey boiler or the main boiler supplies all the steam necessary from the capstan aft to the windlass forward and all other auxiliary machinery in between.

When the appalling inefficiencies of the steam-driven windlass, winch, steering gear, capstan, etc., are considered, one wonders why such extravagance is still permitted. The simplicity of steam auxiliaries and their reliability probably account for their use. Surely a well-tested electric auxiliary capable of working in the open and of proved reliability should make steam auxiliaries obsolete.

In vessels above, say, 2000 tons deadweight capacity, it is advisable to arrange the steam plant in two or more units, in order to allow repairs or examinations to be carried out without shutting down the whole plant. In special cases, such as oil carriers, where steam is required almost continuously for tank heating, steam auxiliary machinery will not readily be displaced, but a combination of steam and electrically driven auxiliaries is a very satisfactory alternative.

Much has been written of the advantages of oil-engined vessels over those fitted with steam engines, but little has been said about the large amount of auxiliary machinery to be found in a large oil-engined ship.

Today the electrically driven auxiliary machinery now available for marine work is in every respect as reliable in service as the best type of steam plant, and possibly calls for less attention to maintain it at maximum efficiency. For cost of operation of either type of installation, reference is made to Tables 1 and 2 giving hypothetical cases, estimated by an eminent British marine engineer, Robert Love. He further states:

"These power requirements of auxiliary machinery have been estimated on a basis of the horsepower of each machine, obtained from the results of trials of electrically driven units. In the case of the steam-operated auxiliary machinery the required horsepower of each machine has been taken as being the same as for similar electrically driven gear and the steam required at an average rate of 60 pounds per horsepower per hour."

Steam machinery for engine room and deck purposes can be relied upon to give continuous service under seagoing conditions with low upkeep cost; but in vessels propelled by diesel engines it should be observed that even when the most economical arrangement of type of steam machinery is fitted, the fuel required for auxiliary purposes at sea will amount to from 30 to 35 per cent of that used by the main propelling machinery, or approximately 25 per cent of the total fuel per day at sea.

With electric auxiliaries using current generated by diesel-driven generators, the fuel required for auxiliary purposes at sea will not exceed 5 per cent of that required by the main engines, or approximately 4.5 per cent of the total fuel per day at sea. Also, when working cargo, the electric winches perform the same work

TABLE 1 BRAKE-HORSEPOWER REQUIREMENTS OF A SINGLE-SCREW, DIESEL-ENGINED VESSEL, 2000 TONS D.W.C., 1100 B.HP., 10.5 KNOTS

With Steam Auxiliary Machinery

Auxiliary	Equivalent b.hp. maximum output	Normal sea load	Maximum maneuvering load	Port load-working cargo	
				Maximum	Mean
Steering gear	8	2	3	..	..
Six winches	16(ea.)	..	..	64	48
Windlass	50	..	30	..	..
Heaters	20	7	15	15	6
Lighting	7.5	5	5	7.5	5
Auxiliary compressors	80	..	65	..	..
Jacket pumps	7	6	6	..	..
Piston-cooling pumps	4	3	3	..	..
Lubricating oil pumps	4	3	3	..	..
Bilge and sanitary pumps	10	6	6	6	6
Ballast pump	22	..	..	..	..
Fuel-oil pump	1.5	..	..	..	..
Maneuvering gear	4	..	4	..	..
Turning gear	7	..	..	7	..
Total b.hp.		32	140	99.5	65
Taking steam consumption of auxiliary mach. at 60 lb. per b.hp-hr., lb.		1920	8400	....	3900
Oil used per hr. at 12 lb. of steam per lb. of oil		160	700	....	325
Oil used, tons per day		1.71	....	....	3.5

Fuel for main engine, 4.75 tons per day
Total fuel, main and auxiliary machinery at sea, 6.46 tons per day
Fuel used in port when working cargo, 3.5 tons per day

With Electrically Driven Engine Room and Deck Auxiliaries Capable of the Same Output

	Normal sea load	Maximum maneuvering load	Port load-working cargo	
			Maximum	Mean
Total b.hp.	32	140	99.5	65
Actual loads	110 amp. at 220 volts	330 amp. at 220 volts	..	..
Oil used per hr. by Diesel gen., lb.	17	70	..	32.5
Oil used, tons per day	0.183	..	..	0.35

Fuel, main engine, 4.75 tons per day
Total fuel, main and auxiliary machinery at sea, 4.933 tons per day
Fuel used in port when working cargo, 0.35 tons per day

	Vessel with steam-driven auxiliary machinery Tons fuel	Vessel with electrically driven auxiliary machinery Tons fuel
Days at sea, 250		
Main engine	250 × 4.75 = 1190	250 × 4.75 = 1190
Auxiliary machinery	250 × 1.71 = 428	250 × 0.183 = 46
Days working cargo, 40	40 × 3.5 = 140	40 × 0.35 = 14
Days in port, 75	75 × 0.75 = 56	75 × 0.095 = 7
Total fuel for one year, in tons	1190 for main engines 624 for aux. engines	1190 for main engines 67 for aux. engines
Cost of fuel per year, based on prices ruling at Aug. 1925	1190 tons at $14.70 per ton = $17,493.00 624 tons at $11.20 per ton = $6,988.80	1257 tons at $14.70 per ton = $18,477.90
Saving in fuel cost per year by using electric auxiliaries	$6003.90	

as steam winches with a saving of approximately 90 per cent of the fuel.

The electrical auxiliary machinery has a higher initial cost. It should be observed, however, that against this must be set the cost of the extra fuel continuously required if steam plant is used. In a very few years' service the additional first cost of the electric plant will be completely written off.

Another point not to be forgotten is the lubricating oil consumption. High speed steam engines are as a fact very economical in the use of lubricants. Of course, each individual case should first be thoroughly analyzed from all angles.

In the past, an electric plant in sea service has been considered to require much more attention than steam gear, calling for special knowledge outside the scope of the average seagoing engineer. That this is not now the case is clearly proved by the large number of such installations in completely successful service. For use on board ship none but the best class of electric gear should be fitted. Motors and control gear for deck use should be of the water-tight enclosed type, special attention being given to the rating of the motors and resistances in view of the high temperatures in each operation that may be required, as, for instance, in the tropics.

In the case of cargo winches, which are generally handled by unskilled labor such as is available in the ports visited, it is amazing to see the treatment which winch control gear may have to endure. Further, the method of handling cargo varies in different ports. These points must receive the careful consideration of the designers of deck machinery.

Direct current is in general used on board ships now, both 110 and 220 volts, the 220 voltage for power purpose and the 110 for lighting, obtained by a motor generator set and balancer system. With high voltage a considerable saving in cost and weight of cables and motors is obtained. It is granted that special attention must be given to insulation where higher voltages are used, but the advantages due to the reduction in the sizes of cables, etc., are substantial, and merit the careful consideration of the various classification societies.

TABLE 2 BRAKE-HORSEPOWER REQUIREMENTS OF A TWIN-SCREW, DIESEL-ENGINED VESSEL, 10,000 TONS D.W.C., 2250 B.HP., 10.5 KNOTS

With Steam Auxiliary Machinery

Auxiliary	Equivalent b.hp. maximum output	Normal sea load	Maximum maneuvering load	Port load-working cargo	
				Maximum	Mean
Steering gear	20	4	5	...	..
Nine winches	27(ea.)	..	..	135	80
Windlass	..	..	50	...	..
Heaters	30	10	20	20	8
Lighting	10	7	7	10	7
Aux. comp., 2 fitted each 53 hp.	106	..	80	...	..
Jacket pumps	15	12	12	...	..
Piston-cooling pumps	7	6	6	...	..
Lubricating-oil pumps	7	6	6	...	..
Bilge and sanitary pumps	12	8	8	8	8
Ballast pump	25	..	..	...	..
Fuel-oil pump	3	..	..	...	..
Maneuvering gear	10	..	8	...	..
Turning gear	14	..	..	7	
Total b.hp.		53	202	180	103
Taking steam consumption of auxiliary mach. at 60 lb. per b.hp-hr., lb.		3180	12120	...	6180
Oil used per hr. at 12 lb. of steam per lb. of oil		265	1010	...	515
Oil used, tons per day		2.84	....	...	5.53

Fuel for main engines, 9.75 tons per day
Total fuel, main and auxiliary machinery at sea, 12.59 tons per day
Fuel used in port when working cargo, 5.53 tons per day

With Electrically Driven Engine Room and Deck Auxiliaries Capable of the Same Output

	Normal sea load	Maximum maneuvering load	Port load-working cargo	
			Maximum	Mean
Total b.hp.	53	202	180	103
Oil used per hr. by Diesel gen., lb.	28	100	...	51
Oil used, tons per day	0.3	...	...	0.545

Fuel, main engines, 9.75 tons per day
Total fuel, main and auxiliary machinery at sea, 10.05 tons per day
Fuel used in port when working cargo, 0.545 tons per day

Days at sea, 200	Vessel with steam-driven auxiliary machinery Tons fuel	Vessel with electrically driven auxiliary machinery Tons fuel
Fuel for main engines	200×9.75 = 1950	200×9.75 = 1950
Fuel for aux. engines	200 × 2.84 = 567	200 × 0.3 = 60
Days working cargo, 50	50 × 5.53 = 276.5	50 × 0.545 = 27.7
Days in port, 115	115 × 1.5 = 173	115 × 0.15 = 17.3
Total fuel for one year, in tons	1950 for main engines 1016.5 for aux. engines	1950 for main engines 105 for aux. engines
Cost of fuel per year, based on prices ruling at Aug. 1925	1950 tons at $14.70 per ton = $28,665 1016.5 tons at $11.20 per ton = $11,384.80	2055 tons at $14.70 per ton = $30,208.50
Saving in fuel cost per year by using electric auxiliaries	$9841.30	

The Double-Acting Diesel

THE advent of the new Worthington diesel engine will be watched with interest in shipping circles. The double-acting diesel is a new factor in ocean shipping. It cuts engine weight to an extent that opens up entirely new possibilities of usefulness. It is said that on the basis of the specifications submitted to the Shipping Board for diesel engines to be installed in fourteen government ships, the double acting engine reduces weight about 30 per cent. Of the fourteen diesels ordered by the Shipping Board last December, five will be double-acting.

The two new 2-cycle, double-acting diesels present the following estimated points of contrast with a single-acting, 4-cycle diesel of the same power:

	Single-acting 4-cycle	Double acting 2-cycle
Horse power	2900	2900
Total length	56 ft.	34 ft. 9 in.
Height	28 ft.	25 ft.
Weight	1,100,000 lbs	600,000 lbs.

The average price of the diesel engine awards made by the United States Shipping Board for the single-acting diesel engines per ship horsepower is $84.70, and for the double-acting engines per ship horsepower $75.80.

The Crankless Diesel

EVER since the introducton of the diesel engine in its reciprocating form, manufacturers and users of that economical prime mover have been interested in the reduction of size and weight per horsepower and much work has been done toward the production of forms that would be analogous to the steam turbine.

At the recent exposition of power and mechanical engineering, held from November 10 to December 5, 1925 in New York City, the Crankless Engine Company, Inc., had on exhibit a crankless engine operating on heavy oil on the diesel principle of internal combustion.

In this engine a number of small diameter cylinders are arranged with their center lines parallel to that of the engine shaft. The pistons in these cylinders work through a short rod on a wabble or swage plate fixed on the main shaft at an angle of approximately $22\frac{1}{2}$ degrees. The full pressure in the cylinders is approximately 500 pounds per square inch. The engine exhibited was of 150 indicated horsepower and occupied a space 9 feet in length, 3 feet 4 inches in width, 2 feet $8\frac{1}{2}$ inches in height. Power is developed in four cylinders $7\frac{1}{2}$ inches diameter by 9-inch stroke.

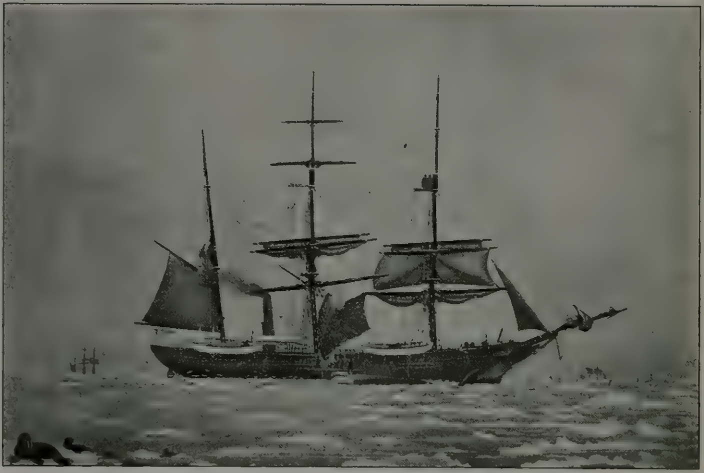
The engine is now undergoing thorough test at the Stevens Institute of Technology. The results of this test will be watched with great interest.

There She Blows!

Some Experiences in Whaling North of Seventy in the Early Eighties

Installment III

By **SEA FLAME.**



San Francisco whaler Narwhal, an interesting view reproduced from an old photograph showing a right whale alongside being stripped of his blubber and the baleen being hoisted aboard with ship's tackle. Note the lookout in the crow's nest.

IN early June the ice-locked waters of Bering Sea began to clear, and the narrow channel at the Diomedes Islands was passable, so that Narwhal could get through to the real Arctic zone. Finding a lead, the vessel was taken up toward Kotzebue Sound, and we were soon over the Circle and headed for regions more northerly. Fairly open water near the entrance of the sound gave us a chance at a couple of whales, but they were shy, and we only captured one. Then the ice near the coast clearing a bit, we made for Port Hope. At this point the drift and floe was too heavy, and we had to tie up to a big block of ground ice near the land. Instead of using the ship's anchor, the ship was moored to the side of the ice by ice-anchors, which are steel bars, or dogs, set down into holes drilled in the body of the ice and to which mooring lines are fast. As the sea is perfectly smooth, the mooring is quite enough and easy to clear when needed. Here we lay for nearly a week, taking occasional trips ashore to hunt wild fowl.

Although ice and snow covered most of the sea, ashore it was green and beautiful. The summers are short up there, but when they do start, things grow quickly and rank. It was certainly curious to gather wild flowers in the sheltered places, perhaps within twenty feet of an old snow bank, itself fast melting away under the rays of a burning Arctic sun. For the sun there does burn, seemingly more than it does in tropical climes. And mosquitoes—ye gods, what voracious creatures! They swarmed thick and fast to get a nip at us, and only by wearing a heavy face veil and gloves could any comfort be had. And another strange thing was that even though the wild flowers and grass grew lushly, a foot below the surface the soil was solid and white as ice. In fact, in those parts the soil never thaws more than to two or three feet below the surface.

Around here we did some more trading with the natives, and the making of fur jackets and pants became quite an industry. One of the boat steerers was a cutter of sorts, and some of the garments turned out were of good fit and looked well, besides being comfortable. We were at this time preparing for the time when we would be frozen in at Herschel Island, in Mackenzie Bay, 72 north, for the long, dreary, and silent arctic winter, which is mostly night. Just now, though, there was little darkness at any hour of the twenty-four, and this little becoming rapidly less, until along the latter part of June there was no night at all, the sun never fairly setting. The hot long days and bright sun rapidly thawed the great ice-fields, and though these days were interspersed with fog and rain at times, the rotting processes went on among the ice masses.

Meets the U.S.S. Bear.

We gradually worked up toward Point Barrow, and here fell in with the old U.S.S. Bear, which at that time was bringing over the nucleus of the great reindeer herds which now form so great a factor in the lives of the natives.

When we reached Sea Horse Islands we anchored off the low-lying shore for a few days, waiting for a favorable chance to make the run to the eastward to the mouth of the Mackenzie River and to Banks Land and Melville Sound, where we hoped to get whales. As we waited for the ice to break we put in time getting everything shipshape. We overhauled engines and washed out boiler, as the run along the northern fringe of the world is sometimes beset with many dangers. The great ice-fields occasionally take a drive toward the north, being carried along by ocean currents. Should a steamer get caught in one of these movements it is pretty certain she will go with the drift, and perhaps never come back from the trip. Sometimes these ice rivers will flow between tremendous masses of ground ice, the floating pieces carried along in crashing and whirling masses, not swiftly, but with an irresistible force, before which the works of man are as futile as a spider's web would be against a hurricane.

Along the shore line were great mountains of drift ice which had been forced up to the beach. The tre-

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mendous pressure behind it carried more and more masses into the jam. The continent would not give way, so the ice simply piled up and over, the masses in the water, pushed and urged forward by the tidal flow, would shove themselves up and onto the unyielding shore bergs, and, with a slow and undeviating movement, thrust themselves up into the air. Masses of probably millions of tons weight would crunch and grind through. An end would slowly emerge from the general ruck and, sliding over the ground ice, would perhaps tower upward a hundred feet or so in the air before its tremendous weight would break it from the main flow, and it would fall with a roar and crash to become a part of the icy barrier at the beach line. The noise of this battle of forces was deafening and awe-inspiring while it lasted. A change in the set of wind or current would come, and things would quiet down and the ground ice would melt and give way, the warm streams from the low hills aiding the melting process.

Ducks and Walrus.

Then we knew in a few days there would be clear water between the beach and the larger ice masses further out. Here we found wonderful fishing and hunting. Ashore there were millions of ducks, all fat and sassy, and the flocks so thick that when a few million flew between us and the sun, it was like a big black cloud and cast as dense a shadow. But not as silent as the clouds, because the whirring of the countless pairs of wings made a humming noise only comparable to the sound of rushing and falling waters. Shooting could hardly be called sport, for all that had to be done was to load a double-barrel gun with duck shot charges, hold the gun vertically, muzzle up, and pull both triggers. Then stand from under the falling birds. Sometimes a shot made this way would bring down ten or fifteen birds. All were fat and splendid eating, and duck soup was no myth those days.

Speaking of shooting, the fact that walrus were in that neighborhood in thousands may be of interest. These great sea animals delight to lie in the sun and sleep at the edge of ice floes. Great herds of them gather together, as they are a gregarious animal. Nothing disturbs them much, and many a time have I seen rows of them for miles along the ice edge, many taking plunges into the water after fish, others, particularly the old bulls, fighting over a young cow, and thousands sleeping, lying like big globs of brown hair on the ice. It was easy to kill them, but such killing would have only been wanton, for they were of no use to us whatever, and the trouble to get one on board and skin it would have been more than the trophy was worth. At times these huge creatures were seen hunting for shell-fish on the beaches. They drive their big ivory tusks down deep into the sand and, using them like a harrow, rip out the clams and mussels from below, promptly devouring them, grinding up shells and all, but deftly separating the indigestible parts out. These same walrus are twin brothers to the sea lions as regards smell, and when to leeward of a big herd, the odor is not of "Araby the blest" by any means.

Bucking the Ice.

Well, at length there came a clear channel out toward the northeast, and a start was made for the run along the coast toward Herschel Island. The captain asked for best speed of engines, and all drawing sail was set. We made fine time for a part of the way to our destination, when we got into a gorged channel of drift ice and began to be borne more northerly than desirable. The drift had to be bucked, and the bow of the old Narwhal was turned across the moving stream ice and headed for an open stretch of water more in shore. But unless experienced it would be hard to believe the force of those slow-moving ice masses.

The Narwhal was not made for big speed, and the crunch and grind of the moving ice reduced even that. From shore bearings it was seen that we were slowly and irresistibly being taken north with the moving field. More power was needed. The captain consulted with me, and knowing from tales told what might be the outcome of being fairly caught and carried north, it was determined to take a chance and carry more presure. The legal pressure at that time was 100 pounds per inch. However, there is a factor of safety of about five at that, so the black gang commenced to crowd her, the safety valve veing blocked. The engines were, as before mentioned, strong and able. The hull was well built. All was in good order, so we gave her more and more steam until the needle of the gage pointed to 220 pounds. The engines did nobly, whirling the clumsy but strong propeller faster and faster. The old Narwhal trembled in all her timbers, but we gradually overcame the northward drift and began to crawl slowly toward open water inshore. Bravely the boiler and engines did their work, and manfully the good old hull stood the tearing strain. Dickie Brothers, hull builders, and George Dickie, maker of the engines, had planned well. Nothing gave way, and we at last slid into open and safe water. But it was a close call and one from which many a vessel would not have escaped. We then quieted things down and took a day or two rest, until the off shore ice had cleared up a bit.

Arctic Mirage.

While waiting at this point we had a sight of a most marvellous mirage. The writer does not know whether these queer mirages are seen only in northern waters, but in over fifty years in all parts of the world never before nor since had he seen the like. The sun was shining brightly; not a cloud marred the pure cold blue of the sky; the vast ice fields to the northward glared white and clear; there was no wind. About two in the afternoon, the sun being then almost over us, there appeared a darkening at a spot in the sky about forty-five degrees from the horizon. This darkening took form, and in a few minutes appeared the vision of another steam whaler, the Beluga, perfect in every detail, with coloring and drift of smoke from funnel. Her image was of full size, but inverted. The people on her decks could be seen with marine glasses, though no sign of the vessel herself was visible from our decks. The captain said that he thought the Beluga at that time was off Point Barrow, about a hundred miles away. Soon another vessel appeared, and in a few minutes there were four in sight, all upside down, but otherwise normal in appearance. The scene lasted about a half hour, and then faded away. It was curious, to say the least, and will never be forgotten.

After a few days delay the stream ice had run itself out, and the channel was again clear toward our objective point. It did not take long to run the ten degrees of longitude, even at our average speed of nine knots; so in about fourteen hours of clear sailing, we were at anchor in a good harbor near Herschel Island.

Thermit Welding Development

IN a paper on the above subject delivered before the fall meeting of the American Welding Society in Boston during October 1925, J. H. Deppeler, chief engineer of the thermit department of the metal and thermit corporation, reviewed the process of thermit welding and the uses to which it is applied in America. The following extract outlining recent developments in the art is of especial interest to marine engineers and ship builders:

The most interesting of these is the elimination of an internal defect which, for want of a better name, we have called "cleavage plane." This defect was discovered in a test run for the purpose of securing the approval of Lloyd's Register of Shipping for the use of thermit welds on stern frames and other important structural parts of ships classified by them; and in these tests, which were run at the Bethlehem Steel Co., Steelton, Pa., the welds were broken under a drop after all excess metal had been machined off and it was discovered that there existed an area just below the axis of the piece on a vertical plane running through the middle of the gap where the metal had been torn apart during solidification and around which the crystals had been very much overstrained. An examination of the fractures showed what appeared to be a dull, gray looking material at this point surrounded by the regular shining crystals of fractured steel. In some cases, this area was more prominent than in others, but its existence was always found by the comparison of tensile strengths of test coupons taken from various parts of the weld.

A careful study of the macro structure of thermit welds proved what was really most logical, and that is that the thermit welds solidified first across the gap between the sections practically on the axis of the pieces and that freezing was progressive from this point outward, and that the part last to freeze was the collar surrounding the thermit weld. It was immediately evident, therefore, that the large risers used in the thermit welding practice were not necessary because the weld, freezing from the inside toward the outside, was just the reverse of the direction of freezing in ordinary casting practice. The function of the riser in thermit welding, therefore, was simply to act as a vent at the top of the mold and to feed the shrinkage of the top part of the collar which was probably the last to freeze. It was discovered that the part of the weld first to freeze coincided with the place where this cleavage plane existed, and it was evident, therefore, that as the weld first started to solidify, some force existed which tended to tear this newly frozen section apart. Further research showed that this freezing at the center of the weld occurred within a very short time after the weld was poured, the sections being welded acting as chills and carrying the heat away very rapidly. It was found, further, that the outer fibers of the sections being welded would not reach their maximum temperature during preheating and not until an appreciable time after the weld was poured. In other words, the heat from the thermit steel collar and from the riser continued to penetrate the solid metal of the parts being welded for some time after the weld was poured, causing these parts around and adjacent to the collar to continue to grow in length, even after the center portion began to solidify. It was this force, therefore, that acted like an enormous jack, and tore the center section apart. In talking of this tearing apart in this discussion, it is, of course, clear that this is merely a matter of degree, and that in many cases the cleavage plane was not actually opened but merely badly over-strained.

Many ways were tried to overcome this internal defect, most of which consisted of changes in design, which tended to feed the shrinkage of this internal part of the weld. The extra molten metal added on the outside simply aggravated the condition and led us to understand the real cause. Obviously, there are only two ways by which this internal defect could have been overcome; first, by increasing the gap between the ends to be welded to a maximum so as to reduce the ratio of heat on the outer fibers to the heat along the axis and, second, to decrease the gap between the ends to a minimum at the same time decreasing the excess heat in the collar and in the riser so that in this way the ratio between the heat on the outside and the heat at the axis would be more nearly uniform. This latter way was tried because the other would tend toward an uneconomical use of thermit, and it was found that by a careful proportioning of the gap, width, and thickness of collar, and by reducing the riser to a minimum, the cleavage plane was eliminated, so that test coupons taken from all parts of a thermit weld vary only a fraction of a per cent.

The new macro photographs do not show the broad sweeping curves of fusion which were typical of the former thermit practice but rather straight fusion lines to within an inch or so of the outside portions of the section.

From an engineering standpoint, this elimination of the cleavage plane was a great step in advance and because the new proportioning of the parts so definitely accomplished this object, it was naturally found that the idea was patentable. But great as was the result from an engineering standpoint, imagine in how much better a position the thermit weld immediately was from a standpoint of economy, because this new design enables us to make a thermit weld using less than half the amount of thermit previously used, and this because of the coincident saving in crucibles, size of mold and labor or ramming the mold actually cuts the cost of welding in half, makes it economical to extend the process to the lighter sections and in the steel mill, for instance, to extend the use of thermit to great numbers of parts which previously could be almost as cheaply scrapped and remade.

In the above, we have only touched lightly on the effect of this change on the crucible cost, and this really deserves more attention because you may not realize that the crucible to contain a steel of so high a temperature must be very carefully made and, because most of the refractories dissolve to some extent in steel at this temperature, the highest grade, dead burned magnesite must be used. A crucible lining of this magnesite lasts in the case of small crucibles for forty or fifty reactions, but in the case of large crucibles holding 600 or 700 pounds of thermit, the lining lasts for only four or five reactions. The new methods have made this crucible problem much less important because in the big welds where two or more of the largest crucibles were used, only one is now necessary, and, where one large crucible was previously used, a much smaller one can now be used, the smaller one costing less in first cost and much less per reaction because of its longer life.

There is another development in thermit welding which the corporation has been working on for some time, the principle of which has been fully developed, which is also covered by patents and has been in successful use. This development is in the nature of an improvement in the crucibles and is very interesting although all thermit users cannot as yet take advantage of it.

In the thermit reaction, there is made in a very short space of time a mass of molten steel and a mass of molten slag of aluminum oxide, and this aluminum oxide is fused alumina, one of the best refractories known. During the brief interval of reaction, this molten steel and molten alumina are made in all parts of the crucible and if the conductivity of the walls of the crucible is sufficient a certain thin layer of this alumina will adhere to the walls and form an effective protection between the thermit steel and the crucible wall We have in this way developed crucibles made of various metals of relatively high heat conductivity, the most practical of which is probably steel, and have so designed the thickness of the crucible wall that it will cause this thin layer of alumina to freeze on its inner surface and not allow the crucible wall itself to be washed away. A crucible so designed without any lining at all will, as far as we know, be practically everlasting. Such crucibles have been in use for over 500 reactions and are just as good today as when they were made. The alumina or slag gradually builds up on the inside wall of the crucibe and after a time has to be removed, when the operation starts over again just as with a new crucible. We naturally have developed the small sizes first, as the thickness of wall at the various diameters is a matter of experiment. The things which have caused a delay in giving this to the thermit welders have been principally due to inequalities in the crucible wall caused by segregation in the steel castings. These difficulties are now being overcome, so that we hope shortly to have the making of these crucibles on a practical manufacturing basis so that they will be a benefit at first to all of our rail welding customers and subsequently to the users of the larger sized crucibles in the locomotive shops and steel mills. Such a crucible, carefully designed, need not be noticeably heavier than the former magnesite lined crucible and, instead of having to be handled carefully in fear of breaking the lining, the steel crucible can be handled roughly without ill effects.

In conclusion, I want to just hint at the enormous amount of work that has already been done in the improvement of the physical qualities of thermit steel and predict that the future will show that, in the thermit reaction, steels can be produced which will have very unexpected properties. Certainly, in this mixture of practically pure aluminum and practically pure iron oxide, we have a basis on which to work which is very different from that which starts with the very impure materials which enter the blast furnaces and which are gradually purified to satisfy the needs of commerce. We have already reached points in thermit steels where, without work or heat treatment, the cast thermit steel will exhibit such properties as 110,000 pounds per square inch ultimate strength, with 2 or 3 per cent elongation in 2 inches, or the other extreme of an ultimate strength of 55,000 pounds per square inch with 40 per cent elongation in 2 inches; and these cast steels are so pure that they invariably fracture through grains instead of along grain boundaries as is the case with ordinary cast steels, so that a thermit weld must not be considered as a cast joint in the middle of forged steel pieces because this thermit cast steel has all of the physical properties of the forging and resists shock just as easily. Certainly, the future of thermit welding seems bright and the many applications ever increasing.

* * *

Some Observations on Propeller Design

By R. Z. DICKIE.

IN 1837 Captain Ericsson towed the British Admiralty barge (with their Lordships aboard) up and down the Thames at 10 miles an hour, using as a towboat a small steam vessel propelled by a screw. This was the first successful application of the modern screw propeller. In the eighty-eight years that have intervened there has been tremendous progress in naval architecture and in marine engineering, but comparatively little progress in the design and application of propellers. It is a significant fact that practically every handbook on marine engineering and practically every textbook on naval architecture or marine engineering almost completely ignores this very vital subject.

We have much literature by specialists in books devoted to the propeller; many papers by specialists on various factors of propeller design; and the record of many tank experiments; but how meager is the record of actual experience and how contradictory are many of the conclusions of our best specialists. Writing in 1886, the eminent British marine engineer, S. Barnaby, declares that "Speed with which water can run up blades of screw depends on head of water over it. Equivalent of 30-foot head is supplied by the atmosphere. Experiments on model of Thorneycroft screw have shown efficiencies as high as 70 per cent when submerged, which reduces with the same screw to 50 per cent when just breaking water with the blade tips. As a result of reducing diameter of a torpedo boat screw from 5'-10" to 4'-6", other conditions remaining identical, the speed was increased from 18 knots to 20 knots. The use of radially expanding pitch has the same effect as greater submersion and tends to reduce wasteful centrifugal discharge of water from blade tips. The quantity of work lost is equal to actual energy of discharged water from screw plus friction of blade area in passing through the water."

Froude at about the same period estimated that if the effective horsepower necessary to overcome net resistance to motion of ship be 100, then additional horsepower needed at the propeller would be 40 horsepower to overcome negative resistance under stern, 10 horsepower to overcome friction of blade area, and 23 horsepower for slip. In other words, out of 174 horsepower delivered at propeller, only 100 horsepower was expended in propelling the ship through the water, thus indicating a propulsive efficiency of 57 per cent for the high speed wheels of that day.

Much salt water has run up and over screw propeller blades since the times of Froude and Rankin. The introduction of the turbine with its high rotative speeds brought many new factors into propeller design, and made necessary the introduction of some form of speed reducing gear between prime mover and propeller in order to get reasonable propeller efficiency. The work of many experts in America and Europe has been given freely in perfecting details of experimental tank technique and in testing models and screws. This has all helped, but the state of the art in propeller design is still far from satisfactory.

Rear Admiral Charles W. Dyson's book on Screw Propellers now in its third edition has become practically a standard textbook on the subject. In the preface to the latest edition the author says:

"Every propeller is a good propeller if used in the conditions for which it is fitted. If it does not meet the conditions of the particular problem to which it has been applied, it becomes at once a bad propeller.

"The writer was first led up to the portals of the cavern of propeller knowledge in 1901 and was invited to go in and search, leaving all means of illumination behind.

"Stumbling along through the darkness he has picked up from time to time nuggets, or what he thought was nuggets, and has had them minted in the form of books."

Much very valuable experimental work is being done on airship and airplane propellers, and Professor S. E. Slocum in recent papers declares in substance that the application of the results of these experiments to marine propeller design demands radially expanding pitch whose best increment of variation for any given diameter or for any spot on the blade face can be determined with almost mathematical precision.

There are many variables incapable of exact mathematical expression, which enter largely into the problem of designing a good practical propeller for the ordinary merchant steamer, and which are largely aggravated for the special designs necessary in towing and in high speed propeller problems.

Hull Condition.

A factor that is seldom considered is the condition of the vessel's hull, especially when the voyage is made through tropical waters. The late Milton L. Towne, formerly chief engineer of the steamship Sonoma, gave a striking illustration of this which was borne out by the vessel's logs on several voyages from San Francisco to Australia. It was customary to dry-dock the vessel every three trips, and it is somewhat surprising to note that the second voyage made after dry-docking registered less fuel with better speed than the first; the first next; and the third the worst. Mr. Towne attributed this to a green slime forming on the vessel about two months after dry-docking which made her drive easier. He said that any speed and power formulate that did not contain "the time of dry-docking" was incomplete.

Mr. Towne's conclusion was borne out in practice thirty years ago on the Pacific Coast, when big bonuses were paid for excess speed on government ships. The day before the trial they were dry-docked and given a coat of black lead and tallow.

In the light of the above, it would seem that an oil solution could be emitted through a system of pipes at the keel of ships that would lubricate the hull and at the same time contain chemical properties that would prevent the start of marine growth. The saving in ships' time and reduced dry-dock expense might easily save the cost and operation of this system.

Wake factor and cavitation are two rather illusive factors commonly discussed.

Wake Factor.

The much discussed subject of wake factor takes on a different aspect since the publication of the results of exhaustive experiments made in Germany, results of which have been borne out by practical experience. That the speed of the wake varies from the center of the propeller to the tips is an established fact and can be compensated for, to a large extent, in propeller design by the use of radial expanding pitch.

Cavitation.

Cavitation is a subject which creates much diversity of opinion both as to its cause and cure, so we will quote a few authorities and let the reader reach his own conclusions.

Admiral Dyson says that cavitation is due to excess thrust, excess tip speed, and the shape of the blades.

The cure he recommends for cavitation is to increase the area and decrease the pitch.

Gumbel, the eminent engineer, after an exhaustive investigation of the cause of cavitation, concluded that cavitation depended largely upon the form of the trailing edge of the blade, and asserted most emphatically that cavitation does not depend upon the mean pressure per unit area nor upon the tip speed, as commonly supposed.

Admiral Taylor says there is little doubt that prime factors involved in cavitation are speed of the blade through the water, which is evidently measured by the tip speed, and the shape of the blade section.

Professor Slocum indicates that cavitation is more severe at the hub, and suggests radial expanding pitch as a cure to compensate for the variation in wake.

In Europe considerable gain has been claimed for entrained thrust columns; in fact, the Kitchen rudder in some instances has shown a gain of about 7 per cent when installed on vessels without making any change in the propelling screw, and still further gains have been shown in some instances where the propellers have been arranged to work in tubes. The contra-propeller installations work largely on the same principle, and have shown even larger gains.

Conclusions.

Producing an efficient propeller design which might be based on an average of the above opinions would give us a propeller with radial expanding pitch with a fairly large area and wide tips with the trailing edge of the blade forming a gradual release for the impinged stream, and with the blade tips curved to form an entraining device for the thrust column.

In view of the fact that a propeller can so greatly influence for better or worse the earning power of any commercial vessel, and that its cost is so small compared to capital investment affected, it would seem to be the part of wisdom in ship operators and owners to carefully analyze the records in each vessel's log from drydocking to drydocking, and to insist that all engineers study propulsive efficiency very carefully. In this way it will often be discovered that a slight change in propeller design costing a few hundreds of dollars will save many thousands in fuel bills, ship's time, and added earning capacity.

Progress in Marine Engineering

By R. J. ALEXANDER

DURING 1925 some very significant steps have been taken in the advancement of marine engineering practice. Of these probably the most startling is the advent of the first-class motor passenger liner. The year opened with the introduction of the Aorangi, first of a number of motor liners of the highest class of speed and passenger accommodations. It closes with the knowledge that the largest passenger liner building today is to be motor-driven. This is the Augustus, with a gross registered tonnage of 30,000, a speed of 21¾ knots, and 28,000 shaft horsepower in four double-acting, 2-cycle, M.A.N. type diesel engines, each having six cylinders of 27-9/16-inch diameter and 47½-inch stroke. The Gripsholm, premier first-class trans-Atlantic motor passenger liner, is another 1925 product.

Thus the diesel engine has taken its rightful place in every phase of merchant marine activity, and after twenty-five years of work against a very strenuous opposition, the advocates of diesel motorships are at the top. The chief work ahead for the diesel marine engineer lies in standardization and reduction in cost of construction.

Steam Progress.

While the diesel engine has saved directly vast quantities of fuel, its influence on the marine steam engine in promoting economy in steam plants has probably made even greater savings.

The year 1925 marks the first commercial effort to introduce high pressure, high superheat steam in marine power plants. Three British marine engineers of note, each of whom in his own line has made much merchant shipbuilding history, have combined to give the world a practical commercial demonstration that a marine steam plant can be built comparable in over-all economy to diesel engine plants. These men are Sir Alfred Yarrow, Sir Charles Parsons, Sir Archibald Denny. The average age of the trio is not less than 70 years. Each of them has long since earned fame and fortune and the recognition of a grateful government. Parsons and Denny built the first turbine driven commercial vessel and formed a company to operate her. She is still running, after twenty-four years' service on the Clyde, and the original company will operate the new steamer. This vessel will have Yarrow boilers, Parsons turbines, and a Denny hull. She will run at 550 pounds steam pressure and 750 degrees Fahrenheit. It would seem that steam, despite the internal combustion engine, is still very much alive.

In America the great bulk of new construction is steam. Elsewhere nearly 60 per cent is diesel.

Materials Handling on Ship and Pier.

This branch of engineering, while properly marine, is more often handled by the mechanical engineer; which is all right provided that engineer gets sufficient maritime viewpoint. The marine engineer, of course, is simply a mechanical engineer afloat.

In the improvement of materials handling methods there is probably a greater opportunity to effect savings in over-all transportation costs than in any other branch of engineering. James A. Shephard, chairman of the executive committee of the Materials Handling Division, American Society of Mechanical Engineers, estimates in the United States a direct labor cost of over $200,000,000 annually in handling cargo tonnage over marine terminals. Robert H. Overstreet, in an article in Pacific Marine Review for Sepetmber, 1925, estimates that cost of cargo handling forms from 20 to 25 per cent of the total direct operating disbursements on American vessels. In commenting on these figures, Mr. Shephard goes on to show that, "as a general proposition, primary reductions in cost are sometimes but a small percentage of final results. Efficiency in materials handling is profitable primarily to the extent of whatever direct savings may be effected. There are usually important secondary results.

"With efficient handling methods the volume of production, or transportation, available with a given equipment is increased, hence it may effect a further important saving through reduction in investment in plant required for performing a given service, effecting also a corresponding reduction in fixed charges. It may also reduce the time during which interest charges will run against capital invested in commodities which are in process of production or transportation, as well as the total of all inventories of goods in transit or in process of manufacture, thus effecting a still further reduction in interest charges.

"It has been estimated that interest charges running against commodities in transit by the railways of the United States have been reduced to the extent of about $40,000,000 annually during the past few years through more expeditious transportation alone. While no attempt has been made to estimate the reduced capital invested in inventories of goods carried in stock by manufacturers, wholesalers, and merchants to bridge former delays in transportation, and its consequent interest charge annually, it is nevertheless conceded that it represents a very large sum.

"The final savings from all sources, direct and indirect, creditable to efficient materials handling will never be fully ascertained until our methods of analyzing the economic efficiency of industrial processes are perfected and applied to the secondary as well as primary economic problems; until engineers who direct the technical affairs of our industries control both mechanical and economic details."

It will be obvious that there is in this branch of engineering tremendous possible savings to the marine operator. This fact is being recognized by the designers of marine terminals in the installation of more materials handling machinery, by the marine engineer in the electrification of deck winches, by the ship operator in the employment of fleets of electric or internal combustion engine-driven trucks for handling cargo on piers, and in many other ways.

However, at the great majority of American ports there is still room for vast improvement in this field, and ship owners, harbor authorities, and marine engineers should cooperate to bring out the best possible solution.

In this connection some very constructive work is being done looking to the development of better construction and material for shipping containers, and a nation-wide campaign for better packing is being carried on which should result in materal reducton in salvage claims.

Pacific Workboats and Their Power Plants

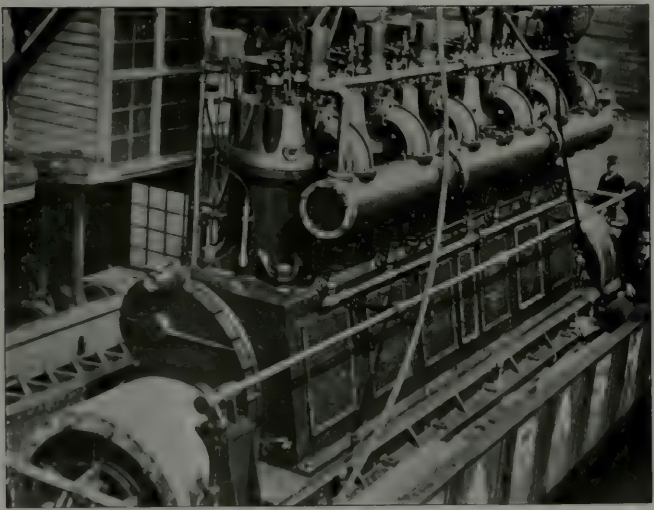
The Washington-Estep Diesel Engine

Ferryboat Kitsap of Seattle, equipped with 600 brake horsepower Washington-Estep marine full diesel engine.

Up until the last four and a half years, the Washington Iron Works of Seattle, pioneer Pacific Coast manufacturing plant established for over 43 years, built only steam machinery. Then, in obedience to the growing demand for a high grade, simple type of full diesel engine which would give the best fuel economy possible, their engineering force developed the present type of Washington-Estep full diesel engine. The following in a general description of these engines, which are built in stationary as well as marine types from 50 to 800 brake horsepower.

The engine is an exceptionally well built prime mover of liberal proportions throughout, simple in operation, economical in the use of fuel, and with remarkable accessibility to all parts for inspection and adjustment. These engines operate on the well known four stroke cycle full diesel principle, using the direct or solid injection method of atomizing the fuel. This makes an exceptionally simple engine to operate by doing away with the complicated high pressure air injection system, as used on some of the older designs, yet giving the best fuel economy possible.

The builders point out that the four-cycle type of engine gives the highest economy and to substantiate their claims mention that, according to latest reports of Lloyds Register of Shipping, over 90 percent of the total gross tonnage in ocean-going diesel driven vessels is equipped with the four-cycle type of diesel engine. Along this same line they mention that the largest and most powerful motor vessel yet built, the Asturias, was launched July 7, 1925, from Harlan and Wolff's Belfast yard. The Asturias is a vessel of 21,700 gross tons, and is equipped with two 10,000 horsepower double-acting Burmeister & Wain type four-cycle diesel engines.



The Washington-Estep 6 cylinder, 600 brake horsepower marine diesel engine ready for installation in ferryboat Kitsap.

Injection System.

The heart of the diesel engine is in the fuel injection system. The Washington Iron Works have perfected their direct or solid injection system to a point where they get the remarkable fuel economy of less than 0.39 pound of fuel per brake horsepower hour. The engines operated continuously under full load with perfect combustion and clear exhaust. The remarkably low exhaust temperature of less than 650 deg. Fahrenheit at full load from an engine operating with a medium compression of 360 pounds per square inch and a brake mean effective pressure of 75 pounds per square inch explains, to a large extent, how it is possible to get this high fuel economy.

The low exhaust temperature not only increases the thermal efficiency of the engine, but greatly prolongs the life of the exhaust valves. In fact, in actual service no trouble has been experienced from the valves, valve seats, or valve stems burning or warping, and they run from eight to twelve months under hard service with little or no attention being required.

The hydraulic fuel pressure for atomizing varies from 1000 to 4000 pounds per square inch, depending on the speed, with a normal pressure of 3800 pounds per square inch at full load. This pressure is maintained from a small multiple plunger fuel pump in integral forged steel block driven by eccentrics at constant stroke and at half the revolutions per minute of the main engine from the cam shaft. These pumps are fitted with a lib-

Tug Goblin of the Gulf of Georgia Towing Company, Vancouver, British Columbia, equipped with 110 brake horsepower Washington-Estep marine full diesel engine.

eral sized stuffing box packed with a special type of semi-metallic packing which has been developed for this particular service and gives remarkably good results without trouble from leakage.

Governor.

A sensitive ball bearing horizontal gear driven governor controls the engine at all loads and speeds by operating direct on the lift of the fuel spray valves by varying the lift and time of the lift through an ingenious yet simple eccentric mounted fulcrum for the lower fuel rocker arm which the governor actuates. An independent micrometer fuel adjustment is provided on this arm, enabling the operator to adjust accurately the fuel feed to each individual cylinder, thus balancing the load and adjusting the engine under actual working conditions for the best results.

Starting and Control.

Washington-Estep engines are self-starting from low air pressure and start instantly from stone cold without heating, will idle indefinitely without cooling off, and will give full power at once. The maneuvering of the larger sizes of Washington-Estep marine diesel engines is accomplished in a simple, reliable manner by the use of moderate pressure of compressed air. The engines can be started either ahead or astern in less than ten seconds. With effective method of governor control of fuel feed at all speeds, this maneuvering can be done at the most desirable speed for the results required. Special attention is called to the fact that when the vessel is in a close place, this maneuvering can be done at extreme slow speed without causing danger to the vessel or landings and with the use of very little volume of air. The governor control handle, or throttle, is adjusted for the desired revolutions wanted, while maneuvering from ahead to astern is accomplished by a single hand wheel which slides the camshaft longitudinally to bring the proper cams under their respective rollers, thus changing the timing to the right sequence, and a slight pull on the air throttle starts the engine in motion. The starting air is automatically shut off as soon as the engine starts to fire on the fuel oil, thus saving air and making simple operation.

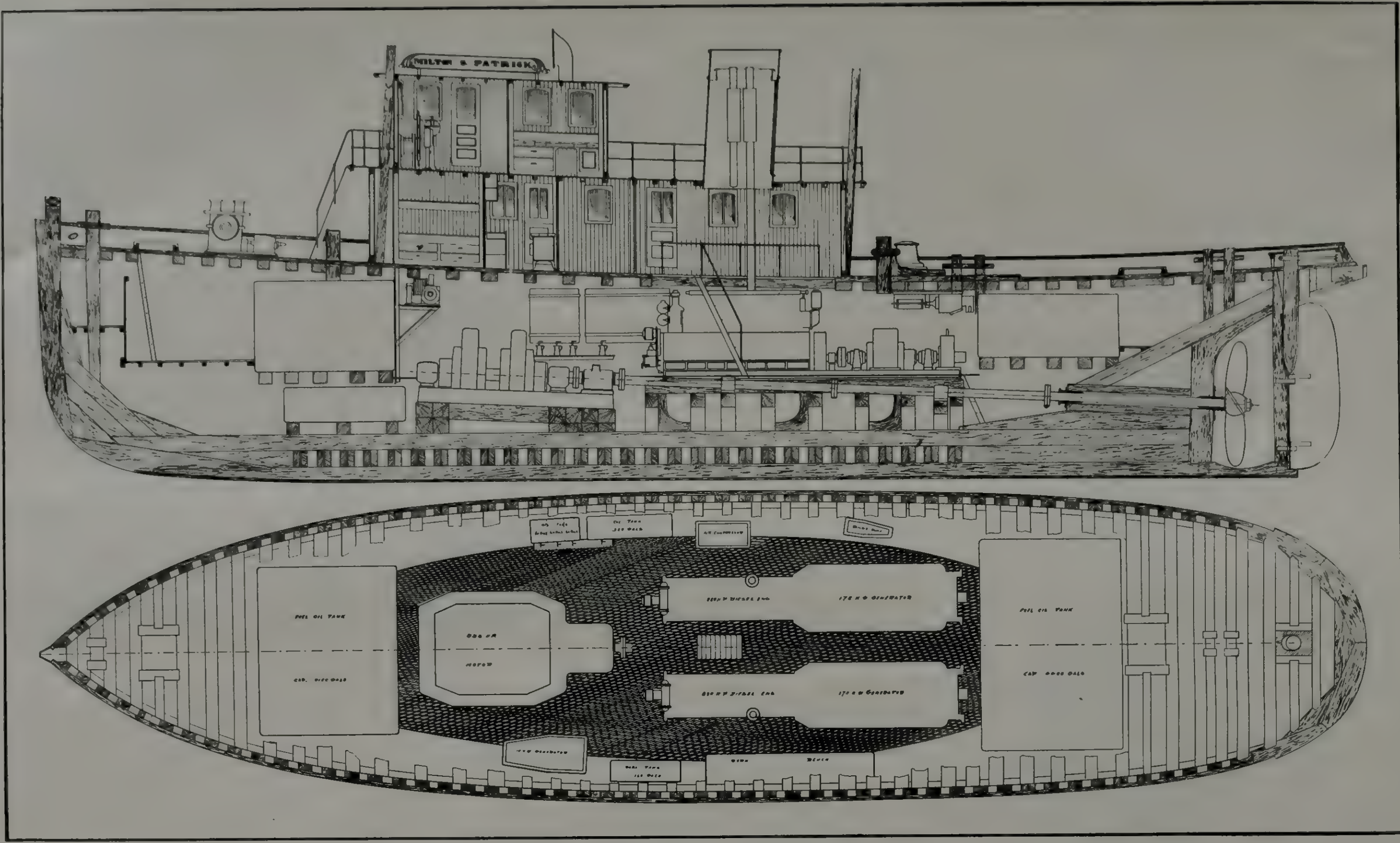
The compressed air is replenished by a liberal size simple, single-acting compressor attached to the main engine; an auxiliary compressor is furnished for stand-by use. This starting air enters the power cylinder via the Washington-Estep type of starting valve through the main intake valve, thus eliminating the necessity of an extra cored hole through the water jacket of the cylinder head. This permits the simple cylinder head casting used and gives a much better water flow around the valves to cool more effectively.

For remote control of the reverse clutch type of engines the Berger patent air control is used, a real improvement for marine practice. This apparatus is very sensitive, easy to operate, uses little or no air, and gives instant control from the bridge or pilot house. The handle of the telegraph operates the clutch exactly as if the operator were at the engine except that all manual labor is eliminated.

To date there are over 4500 horsepower of Washington - Estep diesel engines in service in fishing vessels, tugboats, ferryboats, and other crafts, and they are all showing wonderful success.

The Washington Iron Works' new plant at Sixth Avenue, South and Atlantic Street, Seattle, Washington, is one of the most modern factories on the Pacific Coast, operating a complete plant under one management, of which Gerald Frink is president and manager and Francis G. Frink is vice-president and secretary. Under their able management they have not only built up one of the most modern mechanical and engineering shops in the country, but have developed a large force of competent engineering talent and high grade mechanics, all loyal employees and working with the common object in view of producing a high grade line of engines and machinery.

Offshore halibut schooner Trinity of Seattle, equipped with 110 horsepower Washington-Estep marine full diesel engine.



TWO NOTABLE DIESEL-ELECTRIC TUGS.

Inboard profile, hold plan, and machinery arrangement of two tugs now building for the Wilmington Transportation Company at the William Muller yard, Wilmington, California.

These tugs are each 90 feet in length, and represent the very finest possible construction in wood. They are to be equipped with the latest diesel-electric machinery with full pilot house control. Two Winton diesel engines each of 300 indicated horsepower are each to be directly connected to a Westinghouse 175 kilowatt generator and a 25 kilowatt exciter. These generators deliver power to a double armature, 430 horsepower Westinghouse motor, directly connected to the propeller shaft. The generators and the motor are under full control from the pilot house through a Ward-Leonard system, so that the master can control every movement with the same facility that he would operate his auto.

The vessels are equipped throughout with electric auxiliaries, including an electric warping winch forward, an electric towing machine aft, electric steering gear, and bilge pump. These tugs are to be named Milton S. Patrick and John N. Stewart.

A Satisfactory Small Power Plant

The Mianus diesel engine for small units has given good satisfaction in many marine installations. This engine is of the two-cycle type, simplicity being a feature. The fuel injection is on the Leissner system, which insures complete gasification and division of particles with thorough combustion. The absence of compressors or scavenging pumps is an advantage, these engines using one of the cylinders to charge the air reservoirs for starting.

Fishing boat Lucky Girl of San Pedro, equipped with 35 horsepower 2-cylinder Mianus diesel engine.

Quite a few of these units have been installed on the Pacific Coast, among them being a 35 horsepower engine in the auxiliary yacht Georgeana, owned by John Craig, of Long Beach, California. This vessel, as the illustration shows, is a natty looking craft. She is 110 feet over-all, 25 feet beam, and has 11 feet 6 inches draft. Her Mianus engine will send her along a good 7 knots in favorable weather, though her owner only uses the power for entering and leaving ports and in calms.

Auxiliary yacht Georgeana of San Pedro, equipped with 2-cylinder 35 horsepower Mianus diesel engine.

Another small craft, the Lucky Girl, a fishing boat out of San Pedro, has a duplicate engine to the one in the Georgeana, but this is the sole source of power. She makes about 11 miles an hour with a fuel consumption of about 2¾ pounds.

A Pacific Marine Review representative in looking over a Mianus engin was struck with the completeness of detail in the mechanical work. All studs are evenly cut so as not to project through the nuts; finish at joints is very neat; and all throughout the job appealed to the eye of the trained machinist.

Auxiliary sets for electric generation and for pumping are also made in a large range of capacities up to 200 horsepower.

Boat Yard Notes

Quite a deal of work is being done at the smaller yards in the line of repairs near Hunters Point, San Francisco. The Bay Cities Transportation Company's barge Iroquois was recently on Anderson & Cristofani's ways of overhauling and painting. A State Harbor Commission derrick barge also had some needed repairs made. Several fishing craft are also being renovated, with several under construction.

The new firm of Bruer & Siemer are also fairly well employed.

The twin screw auxiliary yacht building at the yard of John Twigg & Son, Hunter's Point, San Francisco, for H. O. Harrison, of San Francisco, is nearing completion. She will be launched early in the spring. Twin-six Winton engines are being placed on board, and the craft will be complete when launched, with the exception of the masts.

San Francisco yards still keep busy on workboat hulls. Several orders have recently been received for craft of 36, 42, and 65 foot sizes. Two of these go to So. America. Good design and care taken with construction bring results.

WILLIAM MULLER'S YARD.

Above is shown a part of the yard of William Muller, Wilmington, California. In the center are in process of framing two 90-foot tugs for the Wilmington Transportation Company. At the right is a fine auxiliary yacht. The view on the left shows William Muller and his old friend Andrew Young giving the yard the once over. William Muller has built up a splendid reputation for careful, accurate workmanship and for fair dealing, in consequence of which his yard is usually to be found fairly busy on first-class jobs.

Auxiliaries—Ship Supplies—Marine Equipment

Technical Committee Active

THE technical committee of the American Steamship Owners' Association has completed a study of the contra-propeller of the Th. Goldschmidt Corporation, in which the Bethlehem Shipbuilding Corporation is interested. This report has been submitted to the executive committee of the association and is being transmitted to all the member companies, as follows:

"In considering the subject of the contra-propeller, your technical committee was fortunate in having facts and data based upon actual experience contributed by members of the committee to support the claims of the inventor's representatives.

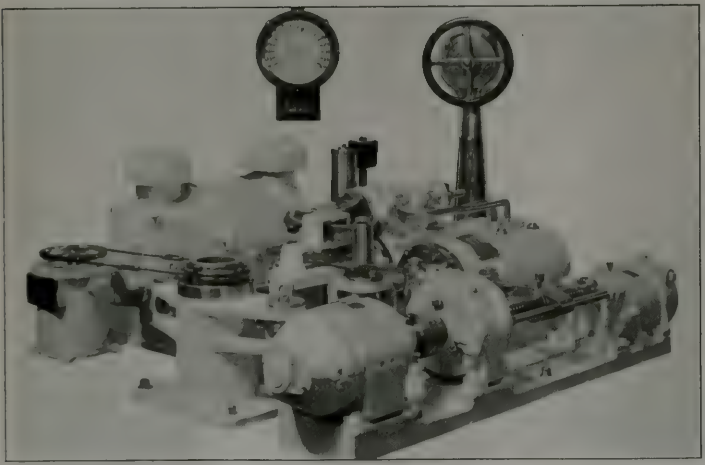
"Our investigations brought out that some 150 European vessels had so far been fitted with contra-propellers, of which eight are twin screw, these 150 vessels including in type and size small tug boats, small and large cargo vessels, and large passenger ships. Twelve American flag vessels have so far been fitted with contra-propellers, of which one is a twin screw vessel, and orders are in hand for two lake-type and three ocean-going vessels.

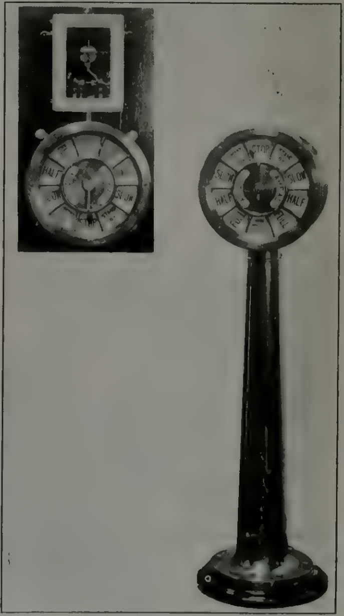
"The average of the savings effected by this device, as stated by the inventor's representative and confirmed by the members of your committee having had experience in operating ships fitted with the device, ranges from 10 to 15 per cent in effective horsepower, with improved steering of vessel and material reduction in vibration.

"In order that members of the American Steamship Owners' Association who are interested in the subject of contra-propellers may have some idea of the capital investment involved, your technical committee are advised that the total cost for a single screw installation of 2400 indicated horsepower, will run from $5000 to $5600, exclusive of dry-docking expenses; where more than one vessel of the same type is fitted this cost will be reduced by about $1100 due to savings in patterns, drawings, etc. The time on dry-dock necessary for installation is about two days.

"The experience of members of the technical committee who have had actual experience with contra-propellers is to the effect that with vessels having slow speed and full lines the savings in effective horsepower are appreciable, but that these savings decrease relatively with higher speeds associated with fine form."

The technical committee of the American Steamship Owners' Association is composed of Edwin C. Bennett, consulting naval architect of the Union Sulphur Company, chairman; Walter L. Green, Jr., superintendent engineer of the Luckenbach Steamship Company, Inc.; B. E. Meurk, superintendent engineer of the Isthmian Steamship Lines; Richard H. Jones, manager marine department of the Tide Water Oil Company; N. J. Pluymert, director the Standard Transportation Company; John H. Telford, marine superintendent of the Munson Steamship Line; Daniel Wilkie, general superintendent of the Ore Steamship Corporation.





THE HYDE WINDLASS COMPANY EXHIBIT.

The Hyde Windlass Company of Bath, Maine, had a very interesting exhibit at the American Marine Exposition in New York last November, featuring their engine room telegraph and their hydro-electric steering engine and rudder indicator. Above is shown the hydro-electric steering engine and at the right the transmitter and receiver of the engine room telegraph.

Rotary Pumps in Pacific Marine Service

By EMMET N. BRITTON,
Sales Engineer, King-Knight Co.

Union Oil Company's Motorship Redline, built by the Moore Dry Dock Company for San Francisco Bay service. The vessel is equipped with three Northern rotary pumps each with a capacity of 250 gallons per minute, for handling the cargoes of gasoline, kerosene and distillate.

"THE OLD order changeth, giving place to the new." In the early days the picturesque windjammer, dependent upon winds, carrying the cargoes of commerce into the seven seas and serving her masters well, gave way slowly to impudent trim-built steamships who gradually usurped her realm, being independent of the whims of the wind as to speed, and dependent only upon the capacity of her bunkers or fuel tanks for cruising radius. Many years this new queen reigned supreme, but her reign is now threatened by another impudent youngster in the form of the diesel-driven motorship, or the latest adaptation of this drive, the diesel-electric motorship.

As the methods of applying motive power to the hulls changed the business of making them run became more complicated, with the attendant demand for increase in efficiencies measured not only in time saved but in the dollars saved the operator of the ship. The number of auxiliaries increased, and with this increase came the demand for better and more reliable equipment.

In number, and perhaps in importance, pumps play the major part in any consideration of auxiliaries on steam, turbo-electric, diesel, or diesel-electric driven ships. The old reciprocating steam pump was not ideal for marine service, for while it had one of the qualities necessary for this exacting service, that of dependability, it was not efficient and it was bulky. The centrifugal pump has its place, but in most types it is not self-priming, it is apt to become air-bound and lose suction, and it cannot handle oils of varying viscosities without losing in its efficiency; so that for many of the duties on board ship it is not applicable. The old gear pump had much in its favor, but it had certain defects that had to be overcome before it would be acceptable to the marine engineer who stakes his reputation not only on the main engines he turns out on the ships, but also on all of the auxiliaries which he recommends and installs. These main defects in the old gear pump, which had many of the qualities needed for marine service, were loss in capacity and efficiency due to the wear on the gear teeth, internal bearings and difficulty in packing against high pressures or when handling refined oils.

In the Northern Rotary Pump, manufactured by the Northern Pump Company of Minneapolis, Minnesota, all of these objections have been overcome and a pump has been made that is meeting the approval of marine engineers all over the world. The wear in the gear teeth has been eliminated by means of timing gears which keep the rotors of the pump in time so that no torque is transmitted from one rotor to the other. The ends of the rotor teeth also have inserted in them packing strips, similar to the piston rings in an engine cylinder, which automatically take up any wear in the casing or in themselves, as they are held out by centrifugal force or by light coil springs, depending upon the speed of the pump. In this pump ball or roller bearings are used which are external to the stuffing boxes, and the pump is so designed that none of the liquid being pumped can come into contact with them.

The stuffing boxes on the Northern pump are specially designed for the liquid being handled, but in all types of pumps the liquid being pumped cannot work along the shaft on account of the by-pass slots cut in the head of the pump. These by-pass slots communicate with the suction of the pump so that the pump is packed against the suction lift, or pressure, and not against the discharge head. This, of course, results in looser packing with the subsequent saving in packing and wear on the shafts.

The first considerations in the building of the pump are sturdiness and dependability, and coupled with these two features is the compactness which makes it fill all of the requirements of marine service. Another feature of the pump is the fact that all of the moving parts of the pump are located in the upper part, and in case of a boat equipped with several pumps of the same capacity, one spare head can be carried which can be placed into service on the old suction base in thirty minutes' time.

In the past two years practically all of the barges built for the large oil companies on the Pacific Coast have been equipped with Northern rotary pumps as cargo pumps, and in the general marine field they have found their place as bilge pumps, fire pumps, sanitary pumps, circulating pumps, and fuel oil transfer pumps. With the further development of the marine field, greater demands will be made upon the manufacturers of marine auxiliary equipment. Anticipating these demands, the Northern Pump Company is constantly striving to keep ahead of them and to turn out equipment which will be recognized by marine architects and engineers as fulfilling all of the exacting requirements of marine service.

Fifty Years of Link-Belt

FIFTY years have passed since the incorporation in 1875 of the Ewart Manufacturing Company, the forerunner of the present Link-Belt Company. In commemoration of the fiftieth anniversary, the Link-Belt Company has published an attractive book entitled **Link-Belt 1875-1925.**

In this book it is mentioned that the patent of William Dana Ewart, a young implement dealer, from Belle Plaine, Iowa, for the detachable link chain, was dated September 1, 1874. Mr. Ewart first started to build a self-binding harvester, but he realized the great need in such a machine for a detachable chain drive that could be repaired in the field, and he worked out the idea of a chain drive, the links of which could easily be replaced by the farmer, who up to that time had been wasting much time in going back to the barn or blacksmith shop for necessary repairs to the strap-link chain drives that were used on some of the first crude binders, or trying to adjust the flat belts which stretched and tightened under varying conditions of heat or moisture in the field.

Late in 1874 when Mr. Ewart came to Chicago with a view to arousing some interest in his detachable link chain, he succeeded in interesting John C. Coonley, a lawyer, who was then president of the Chicago Malleable Iron Company. As a result a company was duly incorporated in 1875, under the name of the Ewart Manufacturing Company, for manufacturing detachable link chain. In 1876, the Ewart chains were exhibited at the Philadelphia Centennial.

New uses for the invention developed rapidly, and in 1880 the Link-Belt Machinery Company was incorporated "to design, build and supply accessory parts, and install elevating and conveying machinery employing Ewart chains." The plant for this company was built in Chicago.

In 1888 the Link-Belt Engineering Company was formed with a plant in Philadelphia. These two plants found increasing numbers of new uses for the chain, with the result that all three plants continued to grow in size until in 1906 a consolidation of the three interests took place, and Charles Piez was elected president.

Alfred Kauffmann, President, Link-Belt Company.

It will be remembered that Mr. Piez was director-general of the Emergency Fleet Corporation during the World War. Mr. Piez is now chairman of the board of directors, and Alfred Kauffmann, formerly vice-president in charge of the two Link-Belt plants in Indianapolis, is now president of the company.

From the humble beginning in 1875 this company now operates and owns ten large manufacturing plants, with seven shops and warehouses and twenty-seven branch offices, and its products now include elevating and conveying equipment for all kinds of materials; complete equipment for the handling and cleaning of coal on the ground and in the boiler house; complete coal tipples and coal washing plants; sand and gravel washing and preparing plants; sand preparing and conveying machinery for the modern foundry; locomotive and crawler type cranes; silent chain drives for industrial plants and for the front end of the automobile—in fact, Link-Belt today builds complete equipment for conveying, handling and power transmission.

Charles Piez, Chairman of the Board, Link-Belt Company.

Trade Literature

Comparision of Diesel Engine Principles, issued by Fairbanks, Morse & Co., Chicago, is a piece of technical sales literature which should be of more than ordinary interest to anyone who is considering diesel engine power.

This bulletin of 32 pages is of considerable educational value, as it analyzes the various factors which influence the design of diesel engines, interpreted in terms of what they mean to the diesel engine user in over-all operating economy, simplicity in operation, low upkeep expense, long life, and dependability.

After many years of experience in the building of 4-cycle gas engines, Fairbanks, Morse & Company adopted the 2-cycle principle in building oil engines. The bulletin points out the many distinct advantages such as mechanical and operating simplicity and the various points are illustrated and described in detail.

Another phase of the diesel engine design which is covered is the subject of airless and air injection of fuel. The two stage scheme of combustion which is used in all Fairbanks-Morse diesels is also discussed. The factors which influence the horsepower rating of a diesel engine are covered in a chapter on "Dissipation of Heat."

This bulletin is somewhat of a departure from the usual type of sales literature in that it treats a highly technical subject in a comprehensive way and yet so that it can be understood by one who has not had an opportunity to make a detailed study of diesel engines.

Diesel-Electric Propulsion Exhibit

THE yacht Aloha, owned by Commodore Arthur Curtis James and famed by several round-the-world cruises, is to be converted to diesel-electric drive, according to a statement issued by Tams & King, naval architects, who have been retained to supervise the new installation.

By mere coincidence, the delivery of this diesel-electric propulsion happened to be about the time of the American Marine Exposition, which was held in the 212th Antiaircraft Regiment Armory, 62nd street and Columbus avenue, New York, during the week of November 9 to 14. The builders of the equipment requested permission of Commodore James to exhibit the equipment at this exposition.

The new propulsion equipment for the Aloha consists of 3 275-horsepower Winton diesel engines, each connected to a Westinghouse 175 kilowatt generator and 30 kilowatt exciter. These units individually or collectively will supply power for a 640 horsepower Westinghouse double armature propulsion motor and the ship's above and below deck auxiliaries.

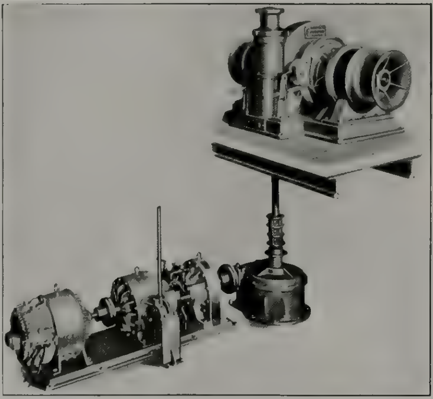
The Westinghouse Electric and Manufacturing Company therefore exhibited in their booth at the American Marine Exposition the pilot house control, which will be used to regulate the speed of the double armature propulsion motor in either direction from zero to 180 revolutions per minute. The Westinghouse company also displayed the dead-front switchboard, propulsion motor, a generator and exciter for the Aloha installation. The Winton Engine Company exhibited one of the three 275-horsepower Winton diesel engines.

Commodore A. C. James' square-rigged yacht Aloha which is being converted to diesel-electric drive.

The new propulsion equipment is the lightest weight of its kind ever built.

American Engineering Exhibit

IN Booth 55 the American Engineering Company of Philadelphia exhibited in operation the electro-hydraulic steerer and electro-hydraulic windlass built for the yacht Aloha, owned by Commodore Arthur Curtis James, of the New York Yacht Club, which is being converted from steam to diesel-electric drive. The steerer is of the same general type as that recently installed on the yacht Lindonia and on a number of motorships, including the Ford motorships East Indian and Benson Ford, and embodies the same principles of design as the very large electric-hydralic steerers built by the American Engineering Company for the airplane carriers Saratoga and Lexington.



Electro-hydraulic windlass, built by the American Engineering Company for the yacht Aloha.

This is the third electro-hydraulic windlass ever built, the other two having been installed recently by the American Engineering Company on H. W. Hanan's yacht Dauntless and Henry Ford's yacht Sialia.

The windlass is driven by an electric motor direct-coupled to a hydraulic pump, the discharge from the latter driving a hydraulic motor that drives the windlass. By varying the stroke of the pump plungers, the discharge from the pump can be varied from zero to the maximum, with corresponding changes in the speed of the hydraulic motor and windlass. The changes are made by means of a hand wheel located at the windlass, without stopping the electric motor or changing its speed.

The flexible control and wide range of speeds enable the windlass to exert tremendous power at slow speed when breaking out the anchor. There is no gear shifting, and the fact that the electric motor operates at constant speed, regardless of the speed of the windlass or the load against which it is pulling, eliminates all complicated electrical controls and protective devices. A much smaller electric motor and storage battery can be used than would be possible without the wide range of speed reduction found in this windlass. The windlass also has a high speed head for handling light lines. This head can be operated by hand when desired.

Telegraph and Gong Systems on Malolo

Charles J. Henshel & Company, Amesbury, Massachusetts, has received the order for the general alarm gong system, the manual fire alarm stations, pilot house indicator, and engine room indicator, as well as the mechanical telegraph between the engine room and the bridge, and docking telegraphs for the steamer Malolo, building at Wm. Cramp's yard for the Matson Navigation Company.

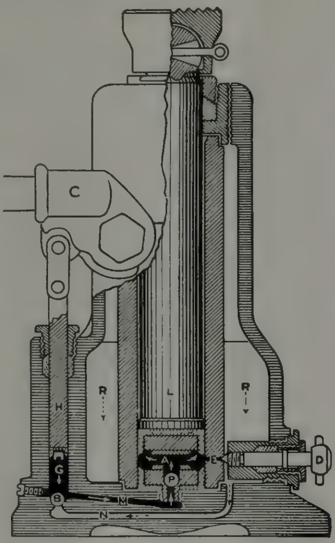
A New Hydraulic Jack

THE Pedersen Oiljak now being placed on the market by the Oil Jack Company, Inc., empodies novel applications of principles long recognized as of prime importance in the design of lifting devices and overcomes difficulties which have prevented successful use of these principles in the past.

The sectional view herewith explains the construction of the Oiljak and its operation. Raising handle of jack, which fits into socket C, raises pump plunger H drawing oil from reservoir R through a channel N and ball check valve B into chamber G. Lowering handle compresses oil in chamber G, seating valve B and forcing oil through channel M past ball check valve P into chamber A, causing plunger L to raise and lift the load. To lower, slightly turn the needle valve D. This opens outlet E and permits oil to travel back again to reservoir R.

There is always absolute control of lifting of load the instant you stop pumping at any point of stroke either up or down. Load positively holds its position. The load is always under instant control. Needle valve D positively controls speed of lowering. Closing needle valve holds load at any point.

Oil is not under pressure in reservoir R, which is in the main casting. Chamber A, where pressure occurs, is entirely surrounded by a steel jacket. There is no chance of leakage, expansion, or breakage.



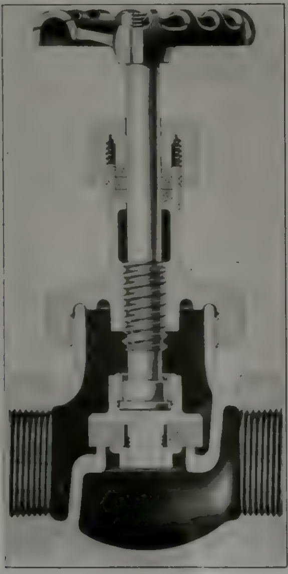
Sectional elevation of the Oiljak.

Every detail of construction has been worked out to insure long service even under rough usage. The swivel head is corrugated and hardened to insure firm grip under load. The ram is solid steel, heat treated and ground. Adjustable oil-retaining packings prevent leakage. The rocker arm is rigidly constructed and provided with a positive stop, oscillates on a heat treated fulcrum bolt and projects over the pump stem and thus protects it. The base is of suitable diameter and the entire casting is amply strong to support many times the rated capacity of the Oiljak.

With the Pedersen Oiljak, any load within the limit of the jack's capacity can be raised with little effort, steadily, smoothly, and quickly. It also lowers the load without jar or shock, and can be instantly stopped at any position. Moreover, the jack may be operated with little short inch-by-inch motions of the handle if desired. This makes the Oiljak particularly practical for cramped quarters or obstructed spaces. In dangerous locations, this jack can be operated at a distance by using a longer handle.

The Oiljak in 10, 6, 3, and 1-ton sizes will be distributed exclusively through jobbers, and all dealers are authorized by the Oil Jack Company, Inc., to replace immediately any Oiljak that is not satisfactory. The 10-ton size is now in production and the other sizes will be ready for distribution shortly.

* * *



Jenkins Bronze Valves

A LINE of medium pressure bronze globe and angle valves for 225 pounds working steam pressure is announced by Jenkins Bros. They have been designed to fulfill a need for a valve with the renewable disc feature which will satisfactorily meet higher pressures than recommended for standard pattern valves. An important feature of these valves is the bonnet and union, made in one piece to screw on to the outside of the body threads. This construction gives added strength to the body end. The bonnet hexagons being made especially large, allow easy removal of the bonnet without distortion. Of special interest is the ball joint, formed when the bonnet and body are screwed together. This is a new feature, designed by Jenkins Bros., which makes a very strong though easily removable joint.

The valves are regularly fitted with the Jenkins Special No. 800 composition disc for high pressure work. A composition disc for a high pressure valve will appeal to those who recognize the superiority of such a disc over a metal-to-metal seat. No regrinding is necessary to insure a tight valve. The spindle is made of manganese bronze, with large, powerful threads which are all in contact when the valve is closed. The stuffing box is deep, with plenty of asbestos packing, which is compressed by means of a bronze follower. A ventilated handwheel of malleable iron is used.

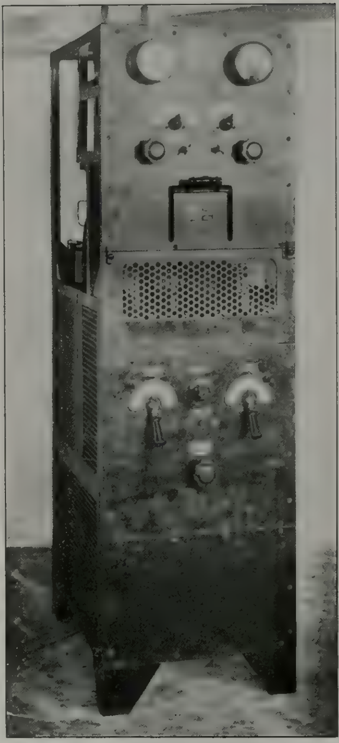
The valves are furnished, globe and angle, with screwed or flanged ends, in sizes of ¼ inch to 3 inches.

Radio Corporation Exhibit

THE Radio Corporation of America's exhibit at the American Marine Exposition includes the RCA radio direction finder and the latest types of tube transmitters and receivers.

The RCA radio direction finder, or radio compass, has a number of novel and exclusive features, including the enclosed loop and superheterodyne receiver. The wires forming the loop are enclosed in watertight bakelike tubing, which protects them from weather and mechanical damage. The receiver is of the superheterodyne type, insuring maximum sensitivity and selectivity.

The new tube transmitters represent the latest development in marine radio equipment. There are two sizes of transmitters in the exhibit, one set having a power rating of 500-750 watts in the antenna, and the other 200 watts in the antenna. The larger set is known as Model ET-3626 and the smaller set as Model ET-3627. The 500-750 watt set has a wave length range of 600 to 2500 meters, and the 200-watt set a wave length range of 600 to 960 meters. These tube sets transmit continuous wave and interrupted continuous wave signals and have transmitting ranges far in excess of the old style transmitters, and at the same time cause no interference to broadcasting or to other marine radio communications. The Radio Corporation reports that a large number of these transmitters have been installed on American ships, and that the results obtained have been highly satisfactory.



The new model ET-3626 R. C. A. Broadcasting transmitter.

Deck Covering for the Malolo

IN the selection of deck covering for the new steamer Malolo, the largest and finest passenger boat ever built in this country, the architects, Gibbs Brothers, and the builders, Wm. Cramp & Sons Ship & Engine Building Co. exercised great care in the selection of a deck covering suitable for the various conditions and problems which would arise on a vessel of this character. They adopted Woodoleum as the best suited for their requirements.

Woodoleum will be used in various types in the large public spaces, passenger ways, and dining saloons. It will be laid in a manner suitable to receive top-tile, that is, with a float or sanded surface which will provide a key for the cementing down of the tiling. This type of surface insures an absolute bond for the top-tile, which will prevent curling or loosening.

Where Woodoleum finish deck is desired, it will be laid in two coats; that is, a cushion coat is first laid, over which ½ inch of colored wearing surface is applied. This wearing layer is troweled to a smooth hard surface, then waxed or oiled, providing a finish that will last the approximate lifetime of the vessel.

Where insulation is of paramount importance, a 2-inch cork slab is applied to the deck and securely anchored, on which Woodoleum is placed in two coats, in a similar manner to that described above. This insulation, in addition to the insulation in the Woodoleum material itself, will provide a cool deck in the quarters adjacent to the boiler and engine rooms.

The Malolo will have approximately 90,000 square feet of this material on her decks, and its selection for this important ship speaks volumes for its dependability in decking applications of all types.

The different types which will be used on this ship were on exhibit at the Marine Show, New York in the Woodoleum Booth, No. 31.

York Compressor Lubricant

THE York Oil and Chemical Company has recently been incorporated as a subsidiary of the York Manufacturing Company for the purpose of refining and marketing lubricating oils especially developed for use in ammonia and carbon-dioxide compressors.

The oils to be manufactured by this new concern are the result of two years of exhaustive commercial and laboratory tests on various oils made by lubricating and refrigerating engineers. This research was carried on in the test plant of the York Manufacturing Company and in commercial plants.

A new refining, blending, purifying, and filling plant has been constructed at York, Pennsylvania, for the housing of the operations of this firm. This consists of a modern, one story, steel and brick building, 126 feet 8 inches long by 76 feet 8 inches wide, with a loading platform on one side 17 feet wide extending the full length of the building. In this structure are partitioned off spaces for offices, oil laboratories, boiler and wash rooms, and extensive floor areas devoted to the manufacture of oils.

Five steel storage tanks, each with a capacity of 12,500 gallons, are used for the storage of stock oils. Over a thousand feet of pipe lines lead from these tanks to blending kettles and purifying and filling apparatus. The plant, which is now on a production basis, has a capacity of 2500 gallons of refined oil a day. This oil will be marketed through the extensive chain of selling agencies of the York Manufacturing Company.

Since many American vessels are equipped with York refrigerating machinery, operating engineers will undoubtedly be glad to know of this opportunity to obtain lubricating oils of special fitness for this service.

The Marine Superintendent

A Blue Nose Skipper

CAPTAIN JAMES GADE, who directs the handling of cargo at San Francisco for several steamship lines, is a busy man. But he is always smiling, and seldom shows the slightest approach to a grouch. When it is considered that Captain Gade has the loading and unloading of the Yamashita Steamship Company's boats at San Francisco, for the Harrison Direct Line, and for the Furness Line, together with the general superintendency of Swayne & Hoyt's fleet of South American and coastwise vessels in all matters pertaining to deck personnel, stores, equipment, and outfitting, he might well be forgiven if he registered irritatioin at times.

But Captain Gade learned his business in the days of sailing vessels on the eastern coast of Canada. He landed there from his native country, Denmark, when he was but 13 years of age, and served in Nova Scotia ships of the old sort as boy, ordinary seaman, able seaman, bo's'n, second and first mate, and while still in his twenties as commander of a tall water ship.

Later he joined the Swayne & Hoyt forces at San Francisco, and has been with them for sixteen years, working up to his present responsible and busy position. He is also vice-president and general manager of the San Francisco Stevedoring Company. Time seldom hangs heavy on the captain's hands, but he never seems to let the multiplicity of jobs worry him. His offices at Pier 21 do not see much of him him except during the late hours of the day, as in no sense of the word is Captain Gade an office man, believing that personal contact with the work in hand is the only way to ensure results.

James W. Prendergast

THE firm of Sudden and Christenson, San Francisco, is well known for many years. Some quarter of a century ago they were engaged in the lumber transportation business exclusively. They were also among the first to operate the "double-ender" type of coaster. Two of these, the Chehalis and Norwood, were among the leaders of their type. Later the firm expanded into trades far afield, with a corresponding increase in their fleet, and now operate twenty large vessels.

Their port engineer, James W. Prendergast, has been with the firm for over twenty-two years. A native of San Francisco, he knows the marine engine and steamer work, having learned the trade of marine machinist at the Aetna Iron Works.

At twenty-four years of age Mr. Prendergast was chief engineer and was employed as such in many vessels of his company's fleet. Some years ago he was promoted to the position he now holds, in which he has the respect and esteem of his many old-time friends, among whom Pacific Marine Review is glad to consider itself one. Mr. Prendergast's headquarters are at the Sudden & Christenson offices, 230 California Street, San Francisco.

Raymond Gunzel

CALIFORNIA has been the native state of many good engineers, and those who had San Francisco for their birthplace were fortunate. Here, in past times, were built many notable steamships, both naval and mercantile, and the young man who took advantage of this school was always well trained. Then the seagoing angle of the work is attractive. The City by the Golden Gate surrounds her sons with marine atmosphere and produces many deep sea engine drivers.

Among these San Francisco products is Raymond Gunzel, marine superintendent for Struthers and Barry. He learned the trade of marine machinist at the old Risdon Iron Works when that firm was one of the principal engine building plants on the coast. Mr. Gunzel was born on Telegraph Hill and imbibed a love of the sea with his earliest sustenance. As soon as his apprenticeship to the trade of machinist was completed, he joined the Pacific Mail Steamship Company, rapidly rising to the position of chief engineer. Later he was with the Atlantic Refining Company for some three years, superintending the construction and installation of the first turbines built at the Union plant of the Bethlehem Shipbuilding Corporation for the steamship company, and was chief engineer of several of the vessels he had looked after while building.

Later Mr. Gunzel was with the marine engineering department of the United States Shipping Board, for four years assistant port engineer of the Pacific Coast Division. In this work he earned the high esteem of the division director. At the reorganization of the Shipping Board, Mr. Gunzel took over the marine superintendency of his present employers, with whom he has been for the past three years. By strict attention to details he has brought his department to a fine state of efficiency and in spite of his many duties is most approachable and affable in all his dealings.

Keeping the Admirals on Schedule

THE positions of port captain and port engineer are in nearly all instances filled by old employees. This is as it should be, as the shoreside job is one that most marine men look for after a life of many years at sea. Always these men are chosen not only on account of their long service, but also with due regard to their loyalty to the company and their records for economical and efficient handling of the departments over which they have had control. At the Pacific Steamship Company wharf offices, Pier 16, San Francisco, there are two men who handle the physical properties of the firm as regards repairs and personnel as well as loading and discharging of freights. These are Captain Charles Hansen and Chief Engineer J. F. Clements. The former attends to the duties of port captain and the latter is port engineer. Both these gentlemen have been with the company for years.

Mr. Clements was with the old Pacific Coast Steamship Company before its absorption by the present firm, being chief engineer for many years after passing through the several grades of assistant. He learned his profession of engineer as a young man in the shops of San Francisco, his native city. Joining the steamship business he entered the parent company's employ over thirty years ago. He has seen the expansion and growth of the

(Continued on Page 52)

Marine Insurance

Developments of the Month

By CHARLES F. HOWELL, Contributing Editor

SUMMARY

When is deviation not "deviation"?

Modern Pirates in "no state's" water.

Boom Babies

A great year on the Great Lakes

Too many fires on coastwise liners.

Dock Protection

Carrier's liability for reserve space

Sugar Risks?

READ AND LEARN

SHIPOWNERS are intimately interested in a recent decision of the Court of Appeals of the State of New York holding that deviation voids a marine insurance policy. The case involved the exciting war experiences of the steamer Ada, which was forcibly detained by the British Navy and eventually sunk by a German submarine. But what concerns shipowners and underwriters most is the application of the principle of deviation, as developed in this suit; because deviation may suddenly make its appearance on any voyage, and it is important that the parties to the insurance contract should understand just where they stand in such a case.

In every policy there is an implied warranty of "no deviation." This means that after the inception of the policy the assured cannot substitute a voyage differing in the slighest from that named in the contract, regardless of whether or not the new route involves a greater or less hazard than did the insured one. The legal principle involved is the ancient one that a contract may not be varied without the mutual consent of the parties to it.

However, there is such a thing as "excusable deviation," as witness the wording of the voyage description in the policy:

". . . . and it shall and may be lawful for the said vessel, in her voyage, to proceed and sail to, touch and stay at, any ports or places, if thereunto obliged by stress of weather or other unavoidable accident, without prejudice to this insurance."

Besides this, deviation is excusable:

1. When caused by circumstances over which the master or owner has no control, or

2. To save human life or to aid a vessel where human life may be in danger.

3. To obtain medical or surgical aid for persons on board ship.

In all such instances of "excusable deviation," it is mandatory that the vessel resume her intended voyage with all possible dispatch. It should also be noted that when deviation voids a policy it does not do so from the very beginning of the voyage, but only from the time and place of the actual deviation, when the underwriter's liability ceases.

It is important to understand another point: The deviation clause in general use, both as regards cargo and hull, does away with much of the importance of the implied "no deviation" warranty through the application of the understanding that the assured is held covered at a rate to be arranged when the facts are known. The full text of this clause is as follows:

"Held covered at a premium to be arranged in case of deviation or change of voyage, or other variation of the risk by reason of the exercise of any liberty granted to the shipowner or charterer under the contract of affreightment, or of any omission or error in the description of the interest, vessel, or voyage."

New York Harbor Pirates.

It costs the shipping interests of New York City a matter of $1,000,000 a year as a result of the petty thievery of illicit junkboat operators and allied pirates in the port of New York. Theft and pilferage

Fireboat Los Angeles City No. 2 on trials in Los Angeles Harbor.

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cover by marine policies shifts this bill of expense upon the shoulders of the underwriters. The situation has become so serious that the attention of city, state, and federal authorities has been called to the evil and their cooperation invoked in combating it. For years the pilferage of cargo, rope, gear, and all kinds of vessel equipment has been going on, but it has been especially flagrant since the recent war. During the past year one steamship company reports having lost, from this source, $15,000 in dry goods, $30,000 in gold, $2500 in coffee, and $1000 in ship equipment.

The Marine Division of the New York Police Department has been doing all it can to check these depredations, but they are handicapped by an insufficient number of boats and men for an adequate harbor patrol. It was planned to limit the number of junkboat licenses, but this was blocked by a court ruling to the effect that the Commissioner of Licenses has no right to refuse a license to any person who can show that he is a legitimate junkboat operator; the prospect is for more of such licenses rather than fewer.

Incredible as it may appear, there is actually a section of the harbor that is a sort of "no man's land" where thieves may operate without being disturbed because of disputed jurisdiction between the states of New York and New Jersey. This section lies off the Robbins' Reef Anchorage, near St. George, Staten Island. The police of Bayonne, New Jersey, insist that their authority does not extend beyond the pierheads, while the New York police say that they themselves have no jurisdiction there. Such ridiculous conditions as this will doubtless soon be adjusted when the various authorities who have been appealed to get down to business.

Questionable New Lines.

There is an enormous increase in the Atlantic coastwise business as a result of the boom in Florida real estate, and the demand for building equipment and all sorts of rush supplies down that way. Naturally, steamship lines are being organized over night and all sorts of steam and sailing craft are being impressed into service in order to get in on some of this trade. The consequence is that irresponsible carriers abound along the Atlantic coast these days, and both shippers and underwriters are under the necessity of making the closest inquiries as to the efficiency and reliability of the mushroom shipping lines that come so easily into existence and pass out with even less effort. The Merchants' Association of New York has issued a warning on the situation. A short time ago, by way of illustration, the association was requested by one of its members to help him out of a difficulty growing out of a shipment he made by a recently formed steamship line that accepted his freight and freight money for transportation to a coastwise port without having clear title to the vessel advertised for the service, with the result that before the vessel sailed it was libeled and the member found the freight loaded in the ship. The promoter who had accepted his freight money was not to be found. The only evidence of shipment that the owner had was his cancelled check covering the freight money and a bill of lading of a company that had apparently melted away during the night.

Best Year on the Lakes.

When navigation on the Great Lakes closed, early in December, it was a satisfactory job for underwriters and shipowners of that region to cast up their accounts. It was at once evident that the season had been the greatest one in the history of the lake trade. The total tonnage moved was estimated at approximately 98,000,000, due, in large measure, to the unusual prosperity in the steel industry. Underwriters are gratified over the fact that losses have been few and comparatively unimportant. It is known, also, that there was a noticeable increase in deep sea shipping on the Lakes, and this despite the limitation of draft in the Welland Canal to 13 feet. Cargoes were sent direct from Chicago to Miami, Florida. Michigan City, Indiana, received shipments of clay direct from Europe in Scandinavian vessels; Duluth had eleven foreign ships clearing, eight of them Norwegian.

The movement of grain from the Northwest and Canadian producing sections was considerably less on the Lakes this year than in 1924, when the record of 543,500,000 bushels was hung up. This was due to the slackening of the demand for wheat from Europe and the Near East. The bulk of Lake traffic was in ore, coal, and grain. A significant comparison of the figures for 1925 with those of 1924 was established by the port records of Duluth, which show 10,305 ships arriving this year as contrasted with 9783 in 1924.

Ship Fire Problems.

The Clyde Line scored its fourth total loss by fire in 1925 when the Lenape fell victim to flames the night of November 21. The cause of the fire remains a mystery, and the unhappy underwriters doubt that it will ever be cleared up. The vessel was insured for $950,000; $600,000 on the hull and $350,-

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000 on disbursements. The latter item covers the expense incurred in fitting the ship out for her voyage. Of this insurance the American Marine Insurance Syndicates had a 25 per cent participation; the balance was placed in London.

The Clyde Line's other total losses from fires in 1925 were the Comanche, October 17; the Mohican, May 10; and the Mohawk, January 28. In addition to these the same line had a ship fire on the Apache, March 11, 1924, and a fire and explosion on the Inca, at San Domingo, August 22, 1922.

As will be understood, such a succession of disasters from fire aboard ship, imperiling human life and destroying much valuable property, has not been allowed to pass unnoticed. An investigation of the burning of the Lenape has been ordered by the Federal Bureau of Steamboat Inspection, and minor quiet investigations are said to be under way. It is certain that the insurance rates for the Clyde Line will advance substantially in view of such an experience, with many offices unwilling to go on such risks at all.

In this connection it is useful to consider the suggestions and recommendations for minimizing fires on shipboard as laid down by the National Fire Protection Association. This body has made a searching study of the subject. Among the recommendations is that of the use of inert gas, such as carbon dioxide, for the extinguishing or prevention of fire in holds, bunkers, and other closed compartments not normally accessible to crews while at sea. Use of noncombustible material in the construction of superstructures, so far as possible, is also urged. Stress is laid on proper inspection, tests, and maintenance of alarms and extinguishing apparatus. Special attention should be given to stowage and segregation of combustible or otherwise dangerous cargo.

Many coastwise liners have openings between deck spaces which permit a blaze, once started, to sweep a large portion of those ships. The more modern types of coastwise vessels have fire screens and temporary partitions to check fires.

New Orleans Dock Fire.

We have frequently called attention in these columns to the dock fire hazards which are too often allowed to go unaltered at American ports. How serious this menace actually is has been demonstrated by New Orleans in the great blaze in mid-November, which swept away seven blocks of sheds and warehouses on the Mississippi bank at that point. The loss is estimated by New Orleans authorities at about $4,000,000. Among the commodities that chiefly suffered were coffee, on which the loss was about $3,000,000, and pineapples and miscellaneous canned goods valued at $500,000. There was a fairly full coverage of insurance. The underwriters will have to pay something like $650,000 on the docks alone. It is possible to get an idea of how much greater the damage might have been when it is remembered that the New Orleans docks extend for eighteen miles along the river.

Shipping interests should spare no effort to bring home to their city authorities the necessity of constructing proper docks and keeping them in good order. Substructures should be of concrete, with the superstructures of steel with metal walls. Framed piers, with metal sheathing over wood are much more subject to fires, and much harder to defend from flames. Probably the greatest pier risk lies in wooden substructures.

Reserved Cargo Space Liability.

An interesting decision was recently made in the case of the Walton N. Moore Dry Goods Co. vs. the Pacific Mail Steamship Company (1925 A.M.C. 1261) whereby the court held that a shipowner who agrees to reserve space for certain goods on a certain vessel, knowing the goods to be seasonsable and being aware of the shipper's desire for delivery before an apprehended break in the market, is liable for failure to reserve such space. Under such circumstances, the court decided, the carrier is liable for the

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difference in the market price at destination at the time when the goods would have arrived on the agreed vessel, and the market price when they actually did arrive, less freight.

Sugar Season Opens.

Underwriters are particularly engaged at this time in arranging cover for the transportation of sugar from Cuba and southern points to this country and Europe. Despite the strikes in certain important Cuban centrals, the grinding is well under way and every indication points to a large crop movement. The serious disasters of last year have not been forgotten by the underwriters, who were called upon to reimburse for three

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total losses and a number of minor casualties.

In the language of the marine underwriter, sugar is a full cargo business. It is a heavy commodity, and therefore very hard on the vessels that carry it. That is why sugar boats lie so low in the water and are subject to having their seams opened under stress of heavy weather, with damage threatened from the incoming sea water.

The average rate is about 15 cents. The refiners' clause is applied to sugar shipments, which covers particular average if amounting to $100.

Editorial Note.—The above remarks on sugar apparently do not apply on the Pacific Coast business in that commodity. Here the great bulk of the raw sugar is brought from the Hawaiian Islands in a very fine fleet of steamers which are kept in first class order and operated under the highest standard of American merchant marine practice. So that to the Pacific Coast underwriter sugar as a full cargo business is one of the best lines on his books.

Fixtures, Charters, Sales

December 11, 1925.

SINCE our last report the United Kingdom grain market has arrived, and parcels have been booked as high as 40/- for special ports with 37/6 for usual ports for Dec.-Jan. Some steamers have been taken with rates from 34/6 to 36/3 for Dec., Jan., Feb. At present Oriental grain buyers are not in the market.

Rates for lumber in all trades remain firm up to March loading.

The following steamers are reported fixed with grain to the United Kingdom and Continent: British stmr. Eastmoor, 32/6, Dec.; Norwegian m.s. Theodore Roosevelt, 33/9; Jan., Kerr, Gifford & Co.; British stmr. Pearlmoor, 32/6, Dec.; British stmr. Fernmoor, 35/-, Jan., Dutch steamer Alchiba, 35/-, Jan.; Balfour, Guthrie & Co., Japanese stmr. Naples Maru, Jan., Strauss & Co.; British stmr. Salmonpool, Jan., Kerr, Gifford & Co.; British stmr. Tiberton, 34/-, Jan., Wm. H. Pymm, Jr.; British stmr. Larnaston (new), 32/6, Jan.-Feb.; British m.s. King James (new), 35/-; Jan., Balfour, Guthrie & Co.; Japanese stmr. Glasgow Maru, Jan., Balfour, Guthrie & Co.

A Japanese steamer is reported fixed with grain from British Columbia to Shanghai, terms private, Jan. loading, Balfour, Guthrie, & Co.

The British stmr. Cape St. Martin has been taken for lumber from Columbia River and San Francisco to Australia, Dec. loading, terms private, J. J. Moore & Co., Inc.

For lumber to the Orient, the following steamers are reported fixed: Japanese stmr. Tasmania Maru, Puget Sound and Grays Harbor to Japan, Dec., Nakawaga & Co.; Japanese stmr. Ayoha Maru, Columbia River to Japan, Dec., Wilcox Hayes Co.

The Norwegian stmr. Kalfarli is reported taken for lumber from the North Pacific to the West Coast of South America, Jan., W. L. Comyn & Co.

The Japanese stmr. Ayaha Maru is reported fixed with lumber from Columbia River to North of Hatteras by Wilcox Hayes & Co., Dec. loading, and the following steamers are reported fixed from the North Pacific to Florida; Danish stmr. Betty Maersk, Jan., H. D. Davis Lumber Co.; British stmr. Dungeness, Dec., Nettleton Lumber Co.; Danish stmr. Sally Maersk, Jan.; H. D. Davis Lumber Co.; American stmr. W. M. Tupper, prompt, Nettleton Lumber Co.; American stmr. Edna Christenson, C. D. Johnson Lumber Co.; British stmr. Sheaf Crest, late Jan., Nettleton Lumber Co.; Danish stmr. Elizabeth Maersk, $18, late Jan., Nettleton Lumber Co.; American smr. Lackawanna, $21, prompt, Chas. R. McCormick Lumber Co.; Norwegian stmr. Haraldshaug, Dec., charterers not mentioned.

The following time charters are reported: Norwegian stmr. Keywest, one year, delivery North of Hatteras, 97½c, South Alberta Lumber Co.; Danish stmr. England, British Columbia to North of Hatteras, delivery and redelivery North of Hatteras, Dec.; British stmr. Falls City, one year, $1, H. R. MacMillan Export Co.; Japanese stmr. Goshu Maru, four months, Pacific trade, delivery Japan, Suzuki & Co.; Norwegian m.s. Handicap, one year, delivery San Francisco, $1.30, J. J. Moore & Co., Inc.; Japanese stmr. Heiyei Maru No. 11, 3 months, delivery and redelivery Japan, Yamashita Co.; Swedish m.s.

(Continued on Page 52)

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Bids Submitted on Key Route Ferryboats

On November 30 bids were opened in the office of Hibbs, McCauley & Smith, naval architects and marine engineers, of San Francisco, for the construction of two turbo-electric ferryboats for the Key System Transit Company of San Francisco. The low bidder for the construction of the vessels is the Moore Dry Dock Company, Oakland, California.

Plans and specifications of these ferryboats appeared in the November issue of Pacific Marine Review. They will have a length over-all of 276 feet length between rudder posts of 256 feet, breadth over guards of 70 feet, and molded at sponsons of 47 feet. They will have a speed of 14½ to 15 knots, and a passenger-carrying capacity of 4000 with 2340 seats.

Bids submitted are as follows:

Moore Dry Dock Company	$1,659,703; 10 and 11 months' time
Bethlehem Shipbuilding Corporation, Ltd.	$1,732,369, 10 and 11 months' time
Hanlon Drydock & Shipbuilding Company	$1,792,576, 11 and 14 months' time
Pacific Coast Engineering Company	$1,879,996. 12 and 13 months' time
General Engineering & Drydock Company	$1,937,594, 11 and 12 months' time

Bethlehem to Build Two Tank Barges

As a result of the decision made several months ago by the Richfield Oil Company to enter the marine oil market, with the establishment of distributing plants at Los Angeles, South San Francisco, and Oakland, two oil tank barges will be built for the company. The barges will be built by the Union Plant, Bethlehem Shipbuilding Corporation. One will be a diesel-electric, self-propelled barge, and will be built at the Potrero Works, San Francisco; the other will be a tow barge, and will be built at the San Pedro Works. Each will have a capacity of 7000 barrels of oil. The tow barge will be 131 feet long, 40 feet molded beam, and 11 feet 6 inches molded depth, with a loaded draft of 6 feet.

The self-propelled barge will be similar in construction to the one now nearing completion at the Bethlehem plant for the General Petroleum Corporation. She will be 180 feet 6 inches between perpendiculars, 32 feet molded beam, and 12 feet molded draft. The propelling machinery will probably consist of two 250 horsepower Atlas-Imperial diesel engines, and a 450 horsepower Westinghouse propelling motor. William Chisholm, marine superintendent of the Richfield Oil Company, will supervise her design and construction.

Bids Submitted for Shipping Board Diesel Engines Installations

The Emergency Fleet Corporation, 45 Broadway, New York, received bids from five yards for the installation of two Worthington diesel engine units in two of the three Shipping Board steamers Seminole, Tampa, and Unicoi. Bids submitted were by Bethlehem Shipbuilding Corporation, $448,545 on one ship; Morse Dry Dock and Repair Co., $388,900; Todd Shipyards Corporation, $461,965 each on two ships; Newport News Shipbuilding & Drydock Co., $707,000 on two ships; Sun Shipbuilding & Drydock Co., $985.000 on two ships.

The Shipping Board has awarded the Sperry Gyroscope Company a contract for control equipment for steering gears for the 14 vessels which will be converted to diesel propulsion, the equipment being as follows:

1. Dual electric steering control equipment;
2. Self synchronous helm angle indicator (with 2 indicators);
3. Steering motor control panel for after steering station.

The total cost for the equipment for these 14 ships will approximate $53,760.

Work in Prospect

The Harbor Board of Vancouver, British Columbia, are planning the construction of a fireboat.

A group of engineers visited Los Angeles harbor recently to inspect the fireboat recently put into service there, and were very favorably impressed with the design and equipment. This fireboat is dedescribed on Page 14 of this issue.

Gibbs Brothers, naval architects of New York, are working on plans and specifications for a new passenger steamer recently authorized by the stockholders of the Inter-Island Steam Navigation Company, Honolulu. The vessel will cost in the neighborhood of $1,750,000.

Considerable ship construction for Atlantic Coast lines is being forecast by the eastern press for the year 1926 in addition to the large orders recently placed for coastwise and intercoastal liners. Among these are plans for two excursion steamers for the Delaware and Hudson Steamship Company, New York; a passenger and freight vessel for the New York & Southern Steamship Company for their New York-Boston run; a passenger and freight vessel for the Red D Line. The Southern Pacific Company will probably build from one to three passenger vessels for their New York-New Orleans service during the coming year. A. S. Hebble is the superintendent engineer, with headquarters at New York.

The Department of Plant and Structure of the City of New York recently submitted to the City Council a request for an appropriation of $1,650,000 for the construction of six single deck, 151-foot, steel ferryboats.

The Isthmian Line is reported to be planning two diesel electric cargo vessels for the South American service.

The Ward Line, New York, will probably build passenger steamers for the New York, Havana, and

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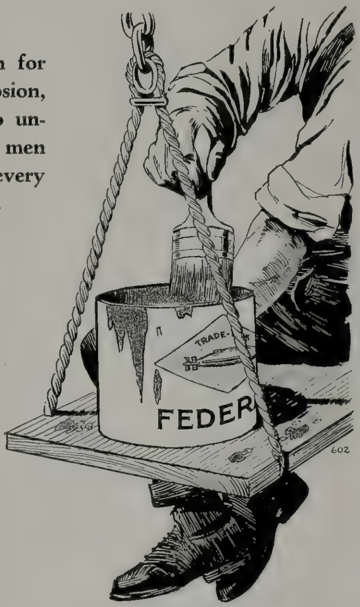

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Mexico service of 7500 gross tons each.

The Pennsylvania Railroad has plans under way for five tugboats of diesel-electric power.

The Navy Department, Washington, D. C., has asked for bids to be submitted by January 19, for construction of scout cruiser No. 25 and furnishing main turbines and gears for scout cruisers Nos. 24 and 25. Steam will be furnished by oil burning boilers to steam turbines driving through mechanical reduction gearing.

Current American Shipbuilding

On November 1, 1925, American Shipyards were building or under contract to build for private shipowners 158 steel vessels of 161,920 gross tons compared with 155 steel vessels of 153,010 gross tons on October 1, 1925, according to the Bureau of Navigation, Department of Commerce. There were 21 wood vessels of 8,263 gross tons building or under contract to build for private shipowners during the same period compared with 21 wood vessels of 8,577 gross tons on October 1, 1925.

During December a number of Lake-type vessels were sold by the Shipping Board to various buyers, most of them for cash consideration of $25,000 with the guarantee to perform certain alterations and betterments approved by the Shipping Board. Among these are the Coquina and Corsicana, sold to Pillsbury & Curtis, ship brokers, of San Francisco; Lake Glaucus, Lake Getaway, and Lake Galata to the Merchants and Miners Transportation Co., of Baltimore; Lake Fabyan and Lake Fernando to the Munson Steamship Line; and Lake Feodora and Lake Falun to the Eastern Steamship Lines, Inc.

News of Pacific Coast Shipyards

The Ballard Marine Railway of Seattle is engaged in the work of converting the former steamship Norwood to an ocean-going tugboat. Her steam engines were replaced by a 200 horsepower diesel engine. The vessel is owned by Captain Russell E. Chesley.

* * *

The Prince Rupert Dry Dock and Shipyard Company will convert the four Canadian Government Merchant Marine steamers to oil burners. These are the Canadian Farmer, Canadian Observer, Canadian Rover, and Canadian Coaster.

* * *

The Vancouver Dredging and Salvage Company is building a small drydock and shipbuilding plant at Coal Harbor, near Vancouver, British Columbia.

* * *

The Commercial Iron Works, Portland, Oregon, has been awarded contract for installing vegetable oil carrying tanker in the Shipping Board steamers West Nomentum.

* * *

Erickson & Klepp, of Rainier, Oregon, is building a tugboat 63 feet long, which will be equipped with a 180 horsepower Fairbanks-Morse directly reversible 6-cylinder diesel engine.

* * *

The Albina Marine Iron Works is building two steel fuel barges for the Army Engineers Corps at Portland, Oregon. Contract was awarded on a bid of $24,484 each.

* * *

The steamer Newport News was purchased by the Alaska Packers' Association, San Francisco, from Captain John F. Blain. The vessel is at the plant of the General Engineering & Drydock Company, Oakland, and is to be reconditioned and put in shape for the handling of cannery hands between San Francisco and the Alaska fishing grounds. It is reported that the Alaska Packers' Association is in the market for another vessel for use as a cannery tender.

Recent Contracts

Newport News Shipbuilding & Drydock Company has more new ship construction contracts to report for the past month than it has been their good fortune to announce for some time. In order of their receipt, they include:

Two passenger and freight steamships for the Clyde Line. These are to be 407 ft. 3 in. over-all, 62 ft. beam, 30 ft. 6 in. depth, and are to be fitted with Newport News turbines and gears and Scotch marine boilers for oil burning;

One diesel engine yacht 162 ft. long for Hugh J. Chisholm;

Three house barges 100 by 30 by 8 ft. 6 in. for the Chesapeake and Ohio Railway;

Two tugboats hulls, 80 by 19 by 12 ft. 6in. for the Pennsylvania Railroad.

There is also the de luxe express passenger and cargo liner for the Panama Pacific Line, to be fitted with water-tube boilers for oil burning and turbo-electric propelling machinery. This vessel will be 600 ft. long, 80 ft. beam, 52 ft. depth, and will be of the highest class in every respect.

Craig Yard Repairs Trinidad

Craig Shipbuilding Company, Long Beach, California, builders and repairers of steel and composite ships, marine and stationary engines, recently announced that their plant is now capable of work on larger size vessels than heretofore due to the recently completed dredging work at Long Beach harbor, which gives a minimum depth of 32 feet. The plant has a drydock of 3500 tons capacity. Herewith is shown a picture of the Hammond Lumber Company's steamship Trinidad on the dock, undergoing general repairs. The plant is doing considerable work overhauling yachts and workboats.

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In Pacific Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairs

They have an order for a diesel engine yacht for Robert Law, Jr., 160 ft. 6 in. long, 26 ft. beam, and 14 ft. 9 in. depth.

The latest contract awarded to this shipyard is for another freight and passenger steamship for the Clyde Steamship Company. This vessel will be 402 ft. over-all, 55 ft. beam, 31 ft. 6 in. depth, and will be fitted with Newport News turbines and gears and Scotch boilers for oil burning.

Bethlehem Shipbuilding Corp., Fore River Plant, Quincy, Mass., was the successful bidder for work of construction on two ferryboats for the city of Boston. These will be 172 ft. between perpendiculars, 40ft. 8in. beam, 10ft. 4½ins. draft. They will be powered with two compound engines of 860 indicated horsepower. The cost of the boats will be $257,975 each.

Dravo Contracting Co., Pittsburgh, has an order for two sand and gravel barges for the Missouri Portland Cement Co.; they will also build six steel barges for stock.

The Pusey and Jones Co., Wilmington, Del., has an order from John H. French of Detroit for a diesel-engined yacht. The craft will be 124 ft. over-all, 20ft. 6in. beam; and 6ft. 10in. draft. Two Winton diesel engines of 300 horsepower each will be installed.

Staten Island Shipbuilding Company was awarded the contract for the construction of a large ferryboat for the city of New York, the American Legion. The boat will be 264ft. over-all, 66ft. beam over guards, 47 feet molded. She will be powered with two compound engines of 3500 indicated horsepower, steam being supplied by four water-tube boilers. The boat will have a speed of 15 miles an hour. The cost of the ferryboat will be $720,000.

Sun Shipbuilding Company has an order from the Sun Oil Co. for three barges.

Keel Layings

Ferryboat for the Philadelphia & Reading R.R. by Bethlehem Shipbuilding Corp., Wilmington, Dec. 2.

Sylvia, steel yacht for Logan G. Thomson, by Defoe Boat and Motor Works, Nov. 15.

Belfont, sternwheel boat for Indiana-Belfont Transp. Co., Oct. 25.

Passenger and freight steamer for Baltimore & Philadelphia Steamboat Co. by The Pusey & Jones Co., Nov. 11.

Siele, diesel yacht for John H. French, Dec. 1.

Three barges for Kelly Axe & Tool Co., Oct. 13, 25, and Nov. 24.

Fairfax, passenger and freight steamer for Merchants and Miners Transportation Co., by Newport News Shipbuilding & Drydock Co., Nov. 12; diesel electric suction dredge for U.S. Engineers, Nov. 19.

Launchings

Kilmarnock, steel tug for Canadian Dredging Co., by Midland Shipbuilding Co., Midland, Ont., Nov. 4.

Frank A. Cunningham, ferryboat for City of New York by Staten Island Shipbuilding Co., Nov. 24.

Carfloat for the Pennsylvania R.R. by Sun Shipbuilding Co., Nov. 27.

Pawnee, yacht for Hany Payne Bingham by Newport News Shipbuilding & Drydock Co., Nov. 10.

Deliveries

Dredge hull to Ellicott Machine Corp. by Bethlehem Shipbuilding Corp., Baltimore, Oct. 27.

Stroudsbury and Newton, barges to J. W. Sullivan Co., by Bethlehem Shipbuilding Corp., Oct. 22 and Nov. 23.

Two steel vessels to U S. Coast Guard by Defoe Boat & Motor Works, Nov. 15.

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In Atlantic Coast *Shipyards*

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U. S. Chicot, sternwheel towboat to U. S. Engineers, Vicksburg, by Howard Shipyards & Dock Co., Jeffersonville, Nov. 14; derrick boat hull to U. S. Engineers, Pittsburgh, Nov. 10; derrick boat hull to Mengel Co., Louisville, Nov. 5; steel ferryboat hull to Burnside Land Co., Nov. 1.

Sam P. Suit, stern-wheel boat to Island Creek Coal Co., by Marietta Manufacturing Co., Dec. 1.

Henry A. Meyer, ferryboat to City of New York by Staten Island Shipbuilding Co., Dec. 7.

Two grain barges for Pennsylvania Railroad by Newport News Shipbuilding & Drydock Co., Dec. 2; barge for Army Engineers, Nov. 28; two tugboat hulls to Pennsylvania Railroad, Nov. 18 and 19.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero, Works

Purchasing Agent: O. W. Streett.

General, hull 5327, diesel-electric tank barge for General Petroleum Corp.; 170 L.B.P.; 32 beam; 11-6 loaded draft; 9 mi. loaded speed: 920 D.W.T. 2 Atlas-Imperial diesel engs., 250 B. H. P. ea; keel Aug. 24/25; launched Oct. 28/25; deliver Dec. 12/25, est.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

No name, hull 47, cannery tender for P. E. Harris & Co., Seattle; 85 long x 18 6 draft x 10 depth; keel Nov. 9/25.

Hull 48, gravel dump scow for State Gravel Co.; 80 x 90 x 9 feet.

Hull 49, fish carrier boat for P. E. Harris & Co.; 36 ft. long; keel Nov. 16/25.

LAKE WASHINGTON SHIPYARDS

Kirkland, Wash.

Purchasing Agent: A. R. Van Sant.

No name, purse seiner, for stock, 65 L.B.P.; 15 beam; 8 loaded draft; engs. not determined; keel Oct. 28/25.

No name, purse seiner, same as above; keel Oct. 28/25.

No name, purse seiner, same as above; keel Oct. 28/25.

Cruiser for stock, 39 L.B.P.; 8-6 beam; keel Oct. 25/25.

NAVY YARD

Puget Sound

Holland, sumbarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng. 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21 deliver April1/26, est.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Thirty barges for the Ohio River Co.; 175x26x11; **20 delivered.**

Twelve barges, Crucible Steel Co., 175x26x11; 5 delivered.

Twelve barges, T. C. I. & Ry. Co., 140x25x9; deliver Jan/26, est.

One fueling scow for Ohio River Co., 90x26x8 feet.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

No name, hull 304, diesel tanker; 480 ft. long; 9500 gro tons; 13,000 DWT; New York-Werkspoor engs. 3200 BHP; keel May/25; launch fall 1925, est.

Hull 312, dredge hull, 140 ft long, for Bneyons Co.; keel Sept/25.

Hull No. 313, dredge hull for American Dredging Co., 135 long; keel Sept /25.

THE AMERICAN SHIPBUILDING COMPANY

Cleveland, Ohio

W. H. Gerhauser, vice-president and director of purchases.

No name, hull, 791, bulk freighter, Pickands, Mather & Co., 580 L.B.P.; 60 beam; 20 loaded draft; 13 mi speed; 12,000 D.W.T.; 2200 IHP., trip. exp. engs.; 3 B, & W. boilers; keel Oct10/25, est.

No name, hull 792, sister to above; keel Nov 10/25, est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT

Quincy, Mass.

Lexington, hull 1300, airplane-carrier U.S.N., launched Oct. 3/25.

No name, hull 1398, ferryboat for City of Boston, 172 L.B.P.; 40-8 beam; 10-4½ draft; 2 Comp. engs. 860 I.H.P.; 2 Scotch boilers; 10′ dia. 13′ long.

No name, hull 1399, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD., BALTIMORE DRY DOCKS WORKS

Baltimore, Md.

Hull 6132, dredge hull, Ellicott Machine Corp., 160 feet long; 40 feet wide; launched Oct. 14/25; **delivered Oct. 27/25.**

Hull 6133, same as above; keel Oct. 17/25.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT

Wilmington, Del.

Stroudsbury, hull 3496, J. W. Sullivan Co., 93 ft 6 in LBP; 25 ft beam; 9 loaded draft; keel June 28/25; launched Sept. 19/25; **delivered Oct. 22/25.**

Newton, hull 3497, same as above; keel June 29/25; **launched Nov. 4/25; delivered Nov. 23/25.**

No name, hull 3500, fireboat for the City of Houston, Texas; 117-6 LBP; 27 beam; 8-6 loaded

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draft; twin screw; diesel-electric drive; 14 mi speed; two 500 HP Winton 4-cycle diesel engs; Westinghouse generators; keel Oct. 5/25.

No name, hull 3501, ferryboat, for Philadelphia & Reading R.R.Co.; 198 L.B.P.; 35 beam; 10 draft; comp. engs. 1100 I.H.P.; 2 Scotch boilers, 11x21 ft.; **keel Dec. 2/25.**

No name, hull 3502, sister to above; keel Dec. 15/25, est.

CHARLESTON DRY DOCK & MACHINERY COMPANY

Charleston, S. C.

Purchasing Agent: Charles R. Valk.

Montgomery, hull 97, snagboat, U. S. Eng. Dept.; 156 LBP; 33 beam; 2 ft 11 in loaded draft; 1 Scotch boiler, 11 ft 6 in by 12 ft 3 in; keel Feb25/25; launched Mar/25; deliver Dec1/25, est.

Freighter for Daytona, Fla.; 22 beam, 4 draft; 8 knots, 60 I.H.P. diesel engs.

Lighter for Daytona, Fla.

Snagboat for U. S. Army Engineers, Montgomery, Ala.

Lighter for Sanford & Brooks.

Ferryboat for Charleston Ferry Commission.

CONSOLIDATED SHIPBUILDING CORPORATION

Morris Heights, N. Y.

Hull 2780, steel cruiser, W. O. Briggs; 118x21; 2 180-HP Winton diesel engs.

Hull 2796, cruiser for C. W. Sellick, 50 ft long; Liberty engs.

Hull 2797, cruiser for R. F. Hoyt, 81 ft long; 2 Wright & Typhone engs, 500 HP each.

Hull 2798, cruiser for H. C. Stutz, 65 ft long; 2 180-HP Speedways.

Hull 2799, cruiser for Elliott & Co., 44 ft long; 180-HP Speedway.

Hull No. 2800, cruiser for J. S. Caldwell, 68 ft long; 2 150-HP Speedways.

Hull 2801, cruiser for L. P. Fisher, 70 ft long; 2 300-HP Speedways.

Hull 2803, cruiser for G. M. Brown, 92 ft long; 2 300-HP Speedways.

Hull 2807, steel cruiser for Carl Fisher, 150 ft long.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO.

Philadelphia, Pa.

Purchasing Agent: Ed. C. Geehr.

Malolo, hull 509, express psgr and frt liner, Matson Navigation Co.; 582 LOA; 577 length at water line; 83 ft beam; depth molded to C deck 54 ft; displacement 22,050 tons; 8250 DWT; speed 22 knots regular, 23 knots maximum; 25,000 shaft horsepower; Cramp-Parsons turbines; oil burning B&W water-tube boilers; keel May4/25.

No name, hull 518, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55-6 beam; 29-6 molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears, six single-ended Scotch boilers; keel Feb. 10/26, est.

Hulls 519-523 inc., 5 steel dump scows for American Dredging Co.; 550 cu. yds. capacity; 112 length, molded; 34 beam; 12 depth molded; keels Dec. 30/25, est.

DEFOE BOAT & MOTOR WORKS

Bay City, Mich.

Purchasing Agent: G. O. Williams.

Hull No. 83, steel vessel, U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 210 DWT; 300 IHP diesel ings; keel Mar. 12/25; **delivered Nov. 15/25.**

Hull No. 84, sister to above; keel Mar21/25; **delivered Nov. 15/25.**

Hull No. 85, sister to above; keel Apr1/25, launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 86, sister to above; keel Apr10/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 87, sister to above; keel Apr18/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hul No. 88, sister to above; keel May5/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 89, sister to above; keel June15/25; launch April 11/26, est; deliver Apr. 15/26, est.

Hull 90, steel patrol boat for U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 12 mi speed; 210 DWT; 300 IHP diesel engs; keel Nov. 1/25; launch Apr 1/26, est; deliver Apr. 15/26, est.

Hull 91; sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 92, sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Sylvia, hull 93, steel yacht, Logan G. Thomson; 133 LBP; 21-6 beam; 7-6 loaded draft; 14 mi speed; 600 IHP twin Bessemer diesel engs.; **keel Nov. 15/25.**

No name, hull 94, wooden yacht for Geo. M. Kelley, Detroit; 55 L.B.P.; 13 beam; 3-9 draft; 13 mi. speed; 13 D.W.T.; 140 I.H.P. gas engs.; keel Jan. 1/26, est; launch May 1/26, est; deliver May 15/26, est.

No name, hull 95, wooden yacht for T. B. Van Dorn, Cleveland, same as above; keel Jan. 1/25, est; launch May 1/26, est; deliver May 15/26, est.

No name, hull 96, wooden yacht for Hacker & Perman, Detroit; same as above; keel Jan. 1/26, est; launch May 1/26, est; deliver May 15/26, est.

DRAVO CONTRACTING COMPANY

Pittsburgh, Pa.

Hull 431, steel quarter boat hull, 60 x32x4, for U. S. Engineers, Huntington, W. Va., 50 gro tons.

Hull 432, steel fuel barge, 80x18x4-6, for U. S. Engineers, Huntington, W. Va.; 60 gro. tons.

Hulls 433-438 inc; 6 steel barges for stock, 135 x27x8; 320 gro tons each.

Hulls 439-444 inc; 6 steel barges 100x26x6-6 for stock; 135 gro tons ea.

Hull 446, oil barge, 2000 bbls. capacity; for U. S. Engineers, Galveston, Texas; 165 gro tons.

Hulls 447-452 inc., 6 steel fuel barges for U. S. Engineers, St. Louis, Mo., 152 x34x6; 300 gro tons each.

Wakerobin, hull 453, lighthouse tender for Bureau of Lighthouses, 153-6 long, 43 beam; 6-6 depth; 900 gro. tons.

Hull 454, 1 sand digger for Keystone Sand & Supply Co., Pittsburgh, 153-6x43x6-6; 900 gro. tons.

Hulls 455-456, 2 steel oil barges, 90x23-6x9; for Atlantic Gulf & Refining Co.; 177 gro. tons ea.

Hulls 457 and 458, 2 sand and gravel barges for Missouri Portland Cement Co.; 130x30x7-6; 280 gro. tons each.

Hulls 459-464 inc.; 6 steel barges for stock; 100x26x6-6; 135 gro. tons ea.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent: R. S. Page.

No name, hull 83, freighter, U. S. Steel Corp.; 250 LBP; 42 ft 9 in beam; 20 loaded draft; 2100 DWT; Worthington engs. 950 SHP; keel Sept. 15/25.

No name, hull 84, diesel-electric freighter, U. S. Steel Corp.; 250 LBP; 42-9 beam; 20 loaded draft; 2100 DWT; 750 BHP Nelseco engs; keel Sept. 24/25.

Willets Point, hull 85, seagoing, diesel-electric hopper dredge for U. S. Army Engineers; 193 ft LBP; 41 beam; 19 ft 6 in depth molded; two Winton diesel engines; keel Dec. 10/25, est.

GREAT LAKES ENGINEERING WORKS

River Rouge, Mich.

Purchasing Agent: Chas. Short.

Halcyon, hull 252, automobile and passenger ferry for Walkerville & Detroit Ferry Co., 128 L. B. P.; 45 beam; 12 loaded draft; 12 mi. speed; 900 I.H.P. F. & A. comp. engs.; 2 Scotch boilers 11 ft 6 in; keel Oct 5/25; deliver Mar 1/26, est.

HOWARD SHIPYARDS & DOCK COMPANY

Jeffersonville, Ind.

Purchasing Agent: Jas. E. Howard.

U. S. Chicot, hull 1580, sternwheel towboat, U. S. Engineers, Vicksburg, Miss.; 108 ft 6 in LBP; 23 ft beam; 3 ft loaded draft; non-condensing engs; 15 inx6 ft; 2 fire-tube boilers, 40 in x 22ft; keel June 12/25; launched Aug. 13/25; **delivered Nov. 14/25.**

Hull 1581, 15-ton derrick boat hull, for U. S. Engineers, Pittsburgh, Pa.; keel Apr. 30-25; **delivered Nov. 10/25.**

One steel derrick boat hull for Mengel Company, Louisville, Ky., 90x34x5 ft.; **delivered Nov. 5/25.**

One steel ferryboat hull for Burnside Land Co., Burnside, Ky.; 69x12x30 feet; **delivered Nov. 1/25.**

One steel power boat hull for Burnside Land Co., Burnside, Ky.; 28x8 ft. one 10 HP Type Z Fairbanks-Morse gasoline or kerosene eng.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wis.

Purchasing Agent: H. Meyer.

No name, double-ended car ferry for Wabash Railroad; 370 L. O. A.; 65 beam, 21 ft 6 in depth; two screws at each end; 4 comp. engs. of 1000 HP each; 6 Scotch marine boilers; deliver spring 1926, est.

MARIETTA MANUFACTURING CO.

Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Sam P. Suit, hull 138, stern-wheel boat for Island Creek Coal Co., 125 LBP; 30 beam; 5 ft loaded draft; 500 IHP tandem comp engs; 3 return tubular boilers; **delivered Dec. 1/25.**

Hulls 145-150, inc., six barges for Indiana-Belfort Transportation Co.; 150 long; 36 beam; 10 draft; keels Aug. 15/25; 2 delivered

Belfont, hull 151, diesel stern-wheel, for Indiana-Belfort Transportation Co.; 100 long; 24 beam; 4-4 draft; 360 HP Fairbanks-Morse diesel engs; **keel Oct. 25/25;** deliver Jan 1/26, est.

MIDLAND BARGE COMPANY

Midland, Pa.

Purchasing Agent: H. S. Neal.

Contract 1042, 1 steel wharfboat for City of Baton Rouge, La.; 230 ft x 40 ft x 12 ft; deliver Dec/25, est.

Contract 1043, 1 steel barge, for U. S. Engineers, Montgomery, Ala.; 80 ft x 26 ft x 5 ft; deliver Nov/25, est.

Contract 1045, dredge for Alleghany River Sand Co., Pittsburgh.

Contract 1046, derrick boat for Alleghany River Sand Co., Pittsburgh.

Contract 1047, hopper float, E. T. Slider, New Albany, Ind.

Contract 1048, 3 hopper barges for Crusible Fuel Co.

Contract 1050, 6 hopper barges for Alleghany River Sand Corp.

MIDLAND SHIPBUILDING COMPANY, LTD.

Midland, Ontario

Purchasing Agent: R. S. McLaughlin.

Kilmarnock, hull 15, steel tug for Canadian Dredging Co., Ltd., Midland, Ontario; 84 ft 3 in L. B. P.; 21 beam; 12 ft. 6 in. depth; TE engs.; 45 HP.; 1 Scotch boiler 12 ft. 6 in. x11 ft. 6 in.; keel Sept. 11/25; **launched Nov. 4/25;** deliver Dec. 16/25, est.

Glenmohr, hull 16, single deck freighter for Great Lakes Transportation Co., Ltd., Midland, Ontario; 633 L. O. A.; 70 beam; 29 depth; 11 knots speed; 18 ft. loaded draft; 15,000 D.W.T.; TE engs. 3000 HP.; **keel Nov. 18/25;** deliver Oct. 1/26, est.

NASHVILLE BRIDGE COMPANY

Nashville, Tenn.

Purchasing Agent: Leo E. Wege.

Nashville B., hull 92, diesel towboat, builders' account; 110 LBP; 28 beam; 5 loaded draft 400 IHP diesel engs.; keel May 1/25; launched Oct. 27/25.

No name, hull 93, barge, for builder's account; 120 LBP; 30 beam; 7 loaded draft.

Burnett, hull 94; diesel-electric towboat, U. S. Engineers; 70 LBP; 17 beam; 4 draft; 150 HP eng.; keel Oct. 10/25; launch Feb. /26, est.

Gillett, hull 95, same as above; keel Oct. 15/25; launch March /26, est.

Kosmortar, hull 97, towboat, twin screw; 75 LBP; 19 beam; 4½ loaded draft; 240 BHP diesel engs.; keel Oct. 10/25; **launched Dec. 4/25.**

Kings-Landing, hull 98; sister to above; keel Oct. 10/25; launch Jan /26, est.

Hull 99, deck barge; 142x32x9; keel Oct1/25; launch Nov20/25, est.

Hull 100, deck barge; 100x24x5; keel Sept16/25; launched Oct. 7/25; **delivered Oct. 15/25.**

Hull 101, deck barge, 100x24x5; keel Jan1/26, est, launch and deliver Feb15/26, est.

Hull 102, deck barge, 100x24x5; keel Feb15/26, est; launch and deliver Mar 15/26, est.

Hull 103, deck barge, 142x32x9; keel Jan. 15/26, est; launch and deliver March 1/26, est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas: Plummer, 233 Broadway New York City.

Coamo, hull 280, combination steamer, New York and Porto Rico Steamship Co.; 412 LBP; 59 ft 6 in beam; 35 depth; speed 15½ knots Newport News-Curtis turbines; 6000 SHP Scotch boilers; keel Jan. 19/25; launched July 22/25; deliver Dec. 22/25, est

Mohawk, hull 287, combination steamer, Clyde S. S. Co., 387 ft 6 in LBP; 54 ft beam; 31 ft 6 in draft; 14½ loaded speed; 2600 DWT; Newport News-Curtis turbines, 4200 SHP; 4 Scotch boilers; keel Apr. 1/25; launched Oct. 21/25; deliver Jan. /26, est.

Chatham, hull 288, combination passenger and freight steamer, Merchants & Miners Transportion Co., Baltimore, Md.; 350 length; 52 beam; 36 depth; 13½ mi speed; TE eng; 4 Scotch oil-fired boilers; keel July30/25; launch Feb/26, est; deliver May1/26, est.

Dorchester, hull 289, sister to above; keel Sept 10/25.

Fairfax, hull 290, sister to above; **keel Nov. 12/25.**

Hull 292, diesel-electric 20-in pipe line suction dredge, U. S. Engineers, Philadelphia; 230 ft long; 40 ft beam; 14 ft depth; McIntosh & Seymour diesel engs.; **keel Nov. 19/25.**

Pawnee, hull 293, yacht for Hany Payne Bingham; diesel eng.; keel Sept. 21/25; **launched Nov. 12/25.**

Hull 294, hull for harbor tugboat, Pennsylvania R. R.; 105 long; 24 beam; 14 depth; keel Aug 20/25; launched Oct. 31/25; **delivered Nov. 11/25.**

Hull 295, hull, same as above; keel Aug 20/25; launched Oct. 31/25; **delivered Nov. 19/25.**

Hull 300, grain barge for Pennsylvania R. R.; 150x30x16-6; **delivered Nov. 2/25.**

Hull 301, sister to above; **delivered Dec. 2/25.**

Hull 302, barge for Army Engineers, Norfolk, Va.; 50x18x4; **delivered Nov. 28/25.**

No name, hull 303, diesel yacht, 2 screws for R. M. Cadwalader; 174 L.O.A.; 27 beam; 15 ft. 8 in. depth; Winton engs.; keel Jan /26, est.

Arcadia, hull 304, diesel yacht, 2 screw, for Galen L. Stone; 177 L.O.A.; 27 ft 6 in beam; 15 ft 8 in depth; Winton engs.; keel Mar/26, est.

No name, hull 305, diesel yacht, 2 screw, for E. S Burke, Jr., 132 L.O.A.; 24 beam; 13 ft 1 in. depth; Winton engs.; keel May/26.est.

No name, hull 306, passenger and freight steamship for Clyde Steamship Company, New York, 407′-3″ overall, 62′-0″ beam, 30′-6″ depth, Newport News turbines and gears; Scotch boilers; oil burning.

No name, hull 307, sister to above.

No name, hull 308, diesel engine yacht, for Hugh J. Chisholm; 162′ 0″ long, 26′-0″ beam, 14′-6″ depth.

Hulls 309-311, inc., three house barges, for Chesapeake & Ohio Railway; 100′-0″ long, 30′-0″

beam, 8'-6" depth.

Hull 312, one carfloat, for Chesapeake & Ohio Railway, 256-0" long, 36'-0" beam, 10'-0" depth.

No name, hull 313, tugboat hull, for the Pennsylvania Railroad, 80'-0" long, 19'-0" beam, 12'-6" depth.

No name, hull 314, sister to above.

No name, hull 315, 18-knot, passenger liner for Panama Pacific Line, New York; 600 ft. long, 80 ft. beam, 52 ft. depth; watertube boilers for oil burning and turbo electric propelling machinery; 22,000 gross tons.

No name, hull 316, diesel engine yacht, for Robert Law, Jr., 160'-6" long, 26'-0" beam, 14'-9" depth.

No name, hull 317, passenger and freight steamship for Clyde Steamship Co., New York, 402'-0" overall, 55"-0" beam, 31'-6" depth; Newport News turbines and gears; Scotch boilers for oil burning.

THE PUSEY & JONES CO.
Wilmington, Del.

Purchasing Agent: James Bradford.

No name, hull 1030, single screw passenger and freight steamer for Baltimore & Philadelphia Steamboat Co., Philadelphia; 219 L.B.P.; 45 beam; 11 loaded draft; 14½ mi speed; 4 crank, TE engs. 21-32-35-35 by 24"; two B. & W. water-tube boilers; 3046 sq. ft. heating surface each; **keel Nov. 11/25**; launch Mar. 10/26, est, deliver July 1/26, est.

No name, hull 1031, sister to above.

Siele, hull 1032, twin screw diesel yacht for John H. French, Detroit; 124 L.O.A.; 20-6 beam; 6-10 draft; 2 300 HP. Winton diesel engs.; **keel Dec. 1/25;** launch Apr. 1/26, est; deliver June 1/26, est.

STATEN ISLAND SHIPBUILDING COMPANY
Staten Island, N. Y.

Purchasing agent: R. C. Miller.

Henry A. Meyer, hull 757, ferryboat City of New York; 151 ft. long; keel Feb. 18/25; **launched Nov. 9/25; delivered Dec. 7/25.**

Frank A. Cunningham, hull 758, sister to above; keel Mar. 27/25; **launched Nov. 24/25**; deliver Dec. 10/25, est.

American Legion, hull 764, ferryboat for City of New York, 264 L.O.A.; 66 beam over-all, 47 beam mld.; 14 loaded draft; 15 mi. speed; abt. 2600 gro. tons; 2 comp. engines, 3500 I.H.P.; 4 W. T. boilers.

SUN SHIPBUILDING COMPANY
Chester, Penn.

Purchasing Agent: H. W. Scott.

Hull 85, carfloat. Pennsylvania Railroad; 358 LBP; 47 ft 4 in beam; 12 ft 6 in depth; keel July 29/25; launch Dec. 24/25, est.

Hull 86, sister to above; keel Aug1/25; launch Dec16/25, est; deliver Jan9/26, est.

Hull 87, carfloat, Pennsylvania R. R.; 250 LBP; 34 beam; 9 depth; keel July 27/25, **launched Nov. 10/25.**

Hull 88, sister to above, keel Aug. 3/25; **launched Nov. 27/25.**

Hull 91, carfloat, Pennsylvania R. R.; 230 LBP; 38 beam; 10 ft6 in depth; keel Aug31/25; launch Dec 10/25, est.

Hull 92, carfloat, sister to above; keel Sept7/25; launch Dec10/25, est.

Wicomico, Hull No. 93, tug, for Pennsylvania R. R.; 116x24x13-8; keel Sept. 14/25; deliver Dec. 26/25, est.

Hull 95, barge for Sun Oil Co., 100x19x9, 50,000 gals. cap.; 100 B.H.P. engs.

Hull 96, barge for Sun Oil Co. 158-x24-4-x11-3, 150,000 gals. cap; 150 B.H.P.

Hull 97, barge for Sun Oil Co., 260x40x15; 750 BHP. engs.

TODD ENGINEERING, DRYDOCK & REPAIR CORP.
Brooklyn, N. Y.

John H. McCooly, hull No. 36, ferryboat, City of N. Y., 148 L.B.P.; 53 beam; 9-9 load draft; keel Feb15/25. launch June 14/25.

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

No name, hull 38, sternwheel towboat, The Ohio River Co.; 145 LBP; 32 beam; 5 draft; recip 700 IHP. engs.; return tubular boilers, 42 in. x 26 ft.

No name, hull 39; steel barge, Kelly Axe & Tool Co.; 150 long, 26 beam; 8 deep; **keel Oct. 13/25.**

No name, hull 40, sister to above; **keel Oct. 26/25.**

No name, hull 41, sister to above; **keel Nov. 24/25.**

No name, hull 42, sister to above.
No name, hull 43, sister to above.
No name, hull 44, sister to above.
No name, hull 45, sister to above.
No name, hull 46, sister to above.
No name, hull 47, sister to above.

Repairs

BETHLEHEM SHIPBUILDING CORP., Union Plant
Potrero Works

Drydock, paint, misc. repairs: Ampullaria, Smith Rice Barge No. 3, S.C.T. Dodd, R. J. Hanna, West Katan, Californian, President Wilson, Shell Oil Barge No. 5, U. S. A. T. Thomas, Floridian, F. H. Hillman, Yankee Arrow, West Jester, Pennsylvanian. Drydock, engine, boiler, and hull repairs: Wellesley, Maui, Katherine Donovan, Sinaloa, Tosca, Shell Oil Barge No. 6, Oaxaca. Engine, boiler, hull repairs: Hauraki, Guerrero, Midway, Matsonia, Priscilla, Chihuahua, Admiral Dewey, Kinderdyk, Chiapas, Admiral Sebree. Tailshaft repairs: West Katan, Margaret Dollar, W. R. Chamberlin, Jr. Pump repairs: West Holbrook. Make and install 15" pump and eng.: Tascalusa. Misc. repairs: West Nivaria, Makaweli, McKittrick, Mexican, Drechdijk, Olinda, Rudy, Liebre, San Pedro, Manchuria, Julia Luckenbach, Harry Luckenbach, Atlantic, Erskine M. Phelps, Hadnot, Kentuckian, Artemisia, L. A. Christensen, Wm. F. Herrin, Borgland, President Van Buren, Hukey, Mongolia, H. M. Storey, Manoa, Edward Luckenbach, Sagadahoc, Empire Arrow, Montrolite, Grelock, Tahiti, American, K. R. Kingsbury, Robert Johnson, Edger F. Luckenbach, Rose City, Indiana.

LAKE WASHINGTON SHIPYARDS,
Kirkland, Washington

Recaulk, new stem and forefoot, new guard, new planking: Pergynt. Misc. hull and engine repairs: ferry Washington, Vega (new guard)), Hyak (new forecastle head). Recaulk new stem, forecastle head, pilot house: ferry Leschi. Paint, Equator. New Shaft: Francis E. Chilhoot. Caulk, new shaft; Alco. New shaft: Lincoln. Paint, misc.; Highway. Caulk: Oregon. Misc. repairs: Ajax, Superior.

VICTORIA MACHINERY DEPOT CO.,
Victoria, B. C.

Boiler repairs: C.G.S. Estevan, tug Nora, Dredge for Northwest Dredging Co., Salvage King. Drydock, hull, tailshaft, and propeller repairs: Island Princess. Drydock hull, boiler, engine repairs due to floundering: tug Superior. Dock, clean, paint: stmr. Otter (cut out and renew stem, make and fit new propeller) dredge (hull repairs), Princess Ena (boiler repairs), Canadian Freighter (renew damaged plates and bilge keel, tailshaft and deck repairs), Princess Maquinna, (rudded and steering gear repairs), Princess Royal (propeller repairs), Harriett E, Transfer No. 8 (hull and engine). Hull repairs due to collision: stmr. Grainer. Deck repairs, stmr. Gray. Supply new boiler fo auxiliaries for new diesel vessel: F. Waterhouse & Co.

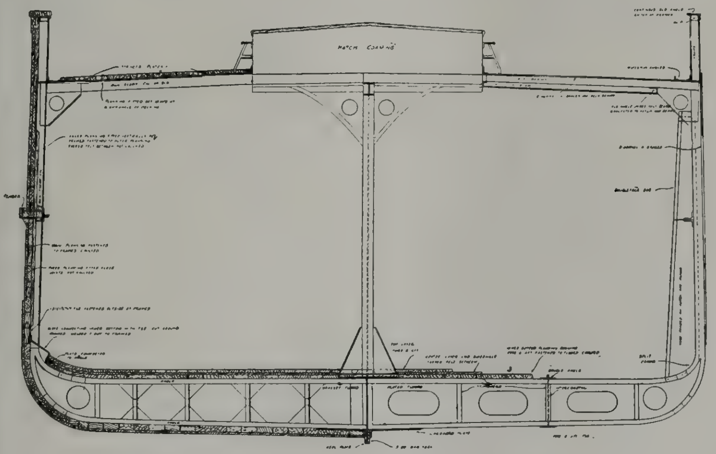
COLLINGWOOD SHIPBUILDING CO., LTD.
Collingwood, Ontario.

Hull caulked: tug Leighton McCarthy. Pontoon placed under hull: dredge General Meade.

The Future Lumber Carrier

The Hagen System of Composite Ship Construction

for medium sized passenger and cargo vessels, towboats, yachts, coast guard cutters, lightships, etc.



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Greater Strength
Less Weight
Longer Life
Lower Maintenance Costs
For Greater Carrying Capacity

Protected by U. S. Patent No. 1,353,235

Correspondence Invited

L. J. HAGEN

1525 MYRTLE STREET OAKLAND, CALIF.

Fixtures, Charters, Sales

(Continued from Page 43)

Inneran, North Pacific to Japan, time charter, lump sum W. L. Comyn & Co., Dec./Jan.; Japanese stmr. Meiko Maru, 5 months, Pacific trade, delivery Japan, Suzuki & Co.; Japanese stmr. Uga Maru, 6 months, Pacific trade, delivery Japan, Suzuki & Co.; British stmr. Siam City, Pacific trade, 5 months, $1, delivery Norfolk, Va. H. R. MacMillan Export Co.

The following tanker fixtures are reported: British tanker British Star, time charter, delivery California, 6-12 months, 4/6, Dec.; French tanker Melpomene, California to United Kingdom, 24/6, Dec., refined and/or spirits; American tanker Agwi, California to North of Hatteras, 65c, December, gas oil; American tanker Dungannon, California to North of Hatteras, 68c, Dec., crude.

The following sales are reported: American schr. Sophie Christenson, Westward Packing Co. to J. E. Shields, Seattle; American stmr. Cape May, U.S. Shipping Board to Matson Navigation Co.; American stmrs. Abraham Lincoln, Andrew Jackson, and Daniel Webster, U. S. Shipping Board to Wm. F. Shupe, $375,000; American stmrs. West Jester and West Jappa, U. S. Shipping Board to Oriental Navigation Co. of New York, $401,000; Lake Fenn, Lake Fandango, Lake Flagon, and Lake Fandon, U. S. Shipping Board to Chas. Nelson Co., San Francisco, $25,000 each; Abron, Dochet, Democracy, and Manhattan Island, U. S. Shipping Board to Fink-Bine Lumber Co., Gulfport, Miss., $570,000.

PAGE BROTHERS, Brokers.

Life Savers

A DRY JOKE.

M. Briand has startled France with a proposed levy on capital. But France is the only country he has startled—they may set the styles in women's clothes, but they evidently sing "Follow the Swallowless" (U.S.) when it comes to taxation.

WHAT NEXT?

The government got all up in the air over Colonel Mitchell and then appears to have fallen out or something.

NO COAL IN THE BUNKERS.

Some of the wiseheads of the country didn't realize just what-in-the-hell they were doing when they sang "Keep Kool with Koolidge." No doubt the administration is counting on keeping the country warm by letting Dawes make a few more "Hell and Maria" speeches.

WHO KNOWS?

Now that the paraffin has settled in Dempsey's nose we wish he'd let us see again what a heavyweight champion looks like in action.

DISCUSSION.

We see by the papers that the Nassau Women Voters' League of L. I. has endorsed the World Court. Now that that's settled we can talk about the coal strike.

BORN TO IT.

Up in Hartford, Connecticut, one of the wardens approached Gerald Chapman the other day and asked him if he wouldn't like to take some exercise.

Whereupon the redoubtable Mr. Chapman replied that he'd like to do a little rope skipping.

DEEP STUFF.

Once upon a time a Vermont farmer boy went to Massachusetts and rising from among the "pork and beans" became governor. While he was occupying this awkward position a strike broke out among the minions of the law. The Governor rose from his awkward position and canned the "bulls."

Because of this (co)incidence said Governor became President and assuming a sitting position in the White House some coal miners walked out. The question for debate is, little children, Resolved: "That Mr Hyde is hiding in the state of Park and Winthrops."

MARS THE WORLD AROUND.

We see that England has made peace in the Hedjas—lessee, that leaves thirty-two wars going on in this peace-loving world of ours, doesn't it? What? Just twenty-nine? I'm sorry—Giddup.

AUTOMATIC HAMMERS.

Another thing we like about Fords is the fact that you don't have to knock them-they do that themselves.

COP'S AFFINITY.

A highly jealous married pair were discussing the important question of a nurse for little Rollo. They had two under consideration; Gertrude, very ugly, and Maggie, a very comely Irish lass. The husband was holding out for Maggie

"George, I want Gertrude."

"But, my dear, I want Maggie."

"George, why do you want her?"

"So we'll have police protection for little Rollo, my dear."

BULL DURHAM.

The dumbest man we ever heard of was the one who wouldn't accept the legacy of a tobacco plantation because he couldn't decide whether to grow cigars or cigarettes.

NOBLESSE OBLIGE.

Two men found themselves strolling toward the City Auditorium. One said "Damned sorry I've got to leave you but I've got to introduce a rotten speaker in here tonight."

The other replied: "Well, I've got to go too, I'm the speaker."

DICTIONARY STUFF.

"Rastus, efen you cracks dat mouf of yourn I'se gwina proscrastinate you from dis yere bateau!"

"Look yere, nigger, talk American—what do dat word procrastinate mean?"

"Put off, you high yaller, put off."

TWO MAC'S.

I had a rare treat yesterday.

How's that?

Sandy bought me a dirnk.

Somebody suggested the fact that Goldsmith wrote "The Deserted Village" about Glasgow, Scotland, on tag day.

MY AM I WET?

Among other things discovered in Florida we have the Philosopher's Stone. Florida's Golden Torrent was transmuted into a flood of Aqua Pura. They had twelve inches of rainfall in twenty-four hours. Boy, page Mr. Darrow—what's this selling patter about sunshine?

TRY A FEW SCHOOL MARMS.

Something this country needs besides a good nickel cigar is somebody that knows how to handle miners.

Sec. Wilbur has recently refused to leave the Cabinet to accept the position of Chief Justice of California. If the Secretary's department in California could have done to criminals what his department in Washington did to aircraft and submarines—well, all we've got to say is, "God help an honest second-story man in a state like that."

A FEW SIGNS.

Red Grange says he'd rather be a halfback for greenbacks than an iceman for exercise.

He-men are having a hard time trying to keep from looking effeminate in these "daze" and times.

The congregation will now rise and bow their heads while the choir renders the Riffian National Anthem: "Who's Sorry Now."

Now is the time to start exchanging some of those Xmas ties for union suits.

Don't forget your New Year's resolution to stop smoking!

Even a town like Dayton, Tenn. may have its trials and tribulations but it soon recovers.

A guy we like
  Is Ernest Thatches;
He ain't forever
  Bumming matches.

L' ENVOI

Well, the Bent Old Man wishes you good winds for the New Year and hopes that all your ships come in under full spread.

Cory Fire Alarm Installations

CONTRACTS have been awarded for equipping the Santa Teresa and Santa Elisa, Coast Line steamships of the Grace Line, with Cory-Aero automatic fire detection and alarm systems. The installation will be made by Chas. Cory & Son, Inc., on the next visit of each of the above ships to the Port of New York.

The systems provide complete protection in all state rooms, smoking rooms, linen lockers and lounge rooms, and are designed with six circuits extending through all passages and compartments in the Cory-Aero protection area. A sectional annunciator and detector cabinet are provided on each ship on the promenade deck, starboard side of saloon passage. A warning signal bell is provided in both the engine room and pilot house whereby audible signals will give warning of any indication of fire which is recorded on the sectional annunciator.

Keeping the Admirals on Schedule

(Continued from Page 38)

concern, and knows intimately the several vessels comprising the fleet.

Captain Hansen was for many years an employee of the Alaska-Pacific Company, retaining his command when the vessel he was attached to was taken over by the present Pacific Steamship Company. He has been in many vessels and understands the work of keeping them moving. The shipshape condition of the fleet is due to a great extent to his watchful eye. Berthings, sailings, and cargo handling come under his direction and these operations are carried out without confusion or turmoil. He keeps in personal touch with the heads of departments and, while strict and particular, all hands like him as he is always just in his criticism and demands.

Personal Paragraphs and Items of Interest

F. C. Knapp Reappointed

REAPPOINTMENT of F. C. Knapp, president of the Peninsula Lumber Company, for another five-year term as a member of the Commission of Public Docks at Portland, Oregan, was announced early in December following a session of the commission. Mr. Knapp has already served ten years with the commission, covering two full terms.

* * *

Miami Freight Agent

Officials of the Admiral Line, owners of the steamer H. F. Alexander, operating between New York and Miami, announce the appointment of H. T. Krull of Seattle as operating and freight agent at Miami. Mr. Krull has been with the Pacific Steamship Company for 28 years in various posts on the Pacific Coast and in the Far East.

* * *

L. A. Marine Exchange

G. A. Glasscock has been appointed service manager of the marine exchange of the Los Angeles Chamber of Commerce, succeeding George H. Sweet, resigned, according to announcement by C. A. James, manager of the Exchange. Mr. Glasscock has been in the shipping business at Atlantic, Gulf, and Pacific ports for a number of years.

* * *

Halvor Jacobsen Resigns

A. O. Andersen, managing director of the Scandinavian-American Line of the United Steamship Company of Copenhagen, announces the resignation of Halvor Jacobsen as general passenger agent for the United States and Canada, effective December 31. Mr. Jacobsen is retiring from active business on the advice of his physician. Helge Peterson has been appointed passenger traffic manager and Victor Scrivani, assistant passenger traffic manager, effective January 1.

W. F. James Promoted

W. F. James has been appointed manager of the Philadelphia district of the Westinghouse Electric and Manufacturing Company, it is announced by E. D. Kilburn, vice-president and general sales manager of the Westinghouse organization. Mr. James succeeds H. H. Seabrook, who has been assigned to special duties. Mr. James has been actively identified with the electrical manufacturing industry since 1896. He joined the Philadelphia sales office of the Westinghouse Electric and Manufacturing Company in 1909.

* * *

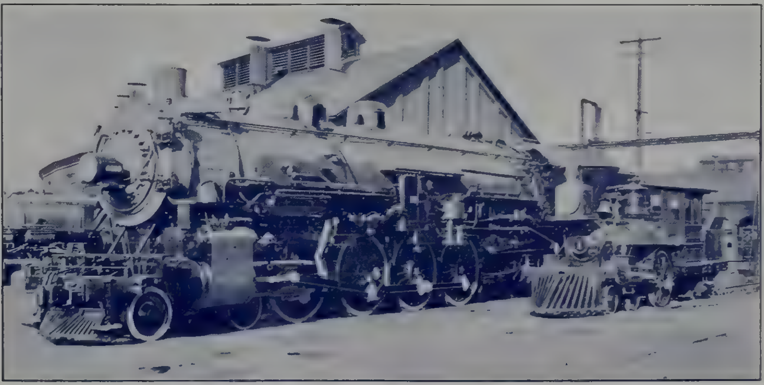
General Electric Changes

George P. Baldwin, general merchandising manager of the General Electric Company, was recently elected a vice-president of the company at a meeting of the executive committee. In his new position Mr. Baldwin will have charge of activities connected with the electrification of steam railroads and such other duties as may be assigned by the president. His new headquarters will be at 120 Broadway, New York. Charles E. Patterson, vice-president in charge of finance since 1920, will take charge of all merchandising activities of the company, including the supervision of the company supplyhouses. He will make his headquarters at Bridgeport, Connecticut.

* * *

Gatewood to London

Captain R. D. Gatewood, well known in San Francisco as former operating manager for the "535" fleet under the Pacific Mail flag, has been appointed in charge of European affairs for the Emergency Fleet Corporation. He has been district director at New York since leaving San Francisco about six months ago.



No. 1 the C. P. Huntington brought around the horn in the Clipper Ship Success in 1864 and No. 4328 built in the Southern Pacific Shops in Sacramento, California in 1925. Contrast shows progress in transportation.

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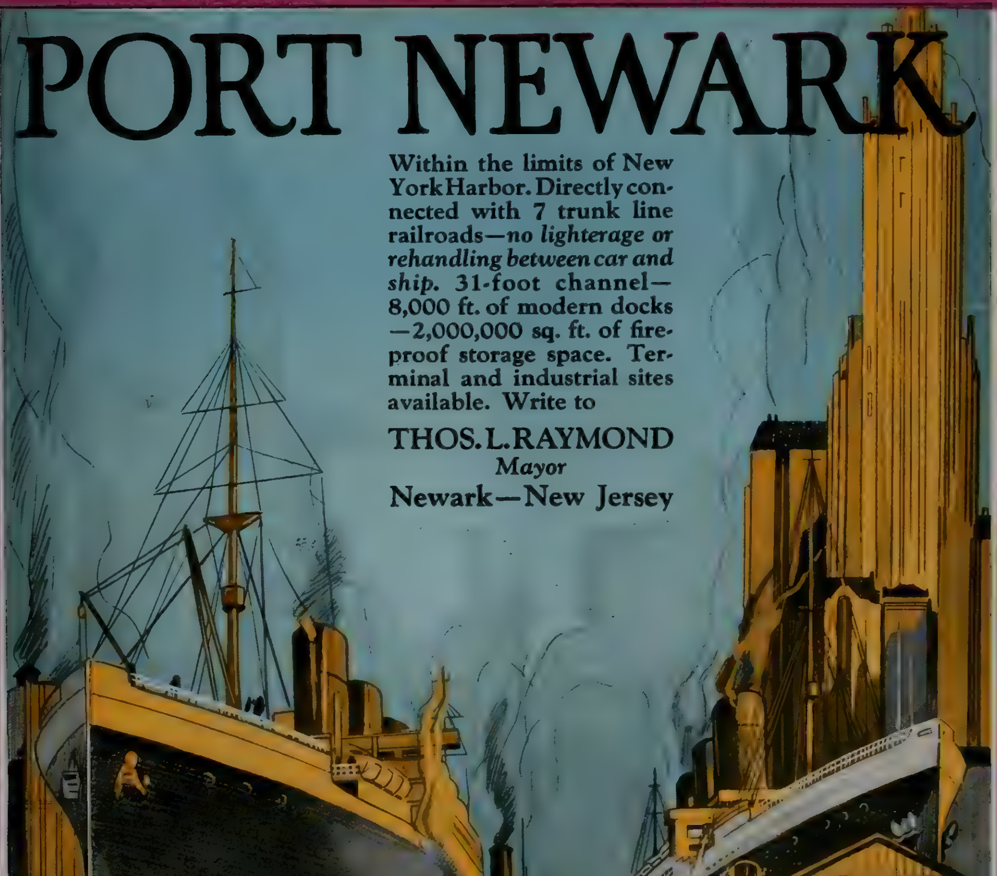
Pacific Marine Review

The National Magazine of Shipping

FEBRUARY, 1926



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SHIPOWNERS' ASSOCIATION
OF THE PACIFIC COAST

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" Remus
" Regulus
" Romulus
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Pacific Marine Review

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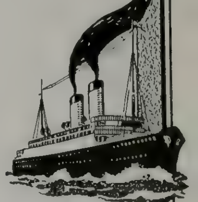
Motorboat Show at Pacific Automobile Show, San Francisco, Exposition Auditorium........ January 30 to February 6
Pacific Foreign Trade Council, San Francisco........ March 4-6
Thirteenth National Foreign Trade Convention, Charleston, S.C......... April 28-30



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Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

576 Sacramento Street, San Francisco
136 LIBERTY STREET, NEW YORK
Wm. Z. Gardner, Special Eastern Representative.

Official Organ
Shipowners' Association of the Pacific

Member of Pacific Traffic Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1924, by J. S. Hines. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Human Salvage

A Timely Analysis of an Interesting Problem now Facing the Steamship Operators of the Pacific Coast

By Norman F. Titus, Manager, Claims-Insurance,
McCormick Steamship Company.

THE bells of the New Year "rang out the old and rang in the new" for a particular phase of the shipping business. When owners, generally, took steps to renew the insurance on their fleets, they were surprised, if not shocked, to find a substantial increase in protection and indemnity rates, as well as a tightening of the conditions of the policy. The first quotations were startling, but after strenuous efforts on the part of brokers some modifications were obtained, with the result that the average placing disclosed a twenty-five per cent increase in cost both on wood and on steel vessels.

What is the meaning of this increase? It is nothing more significant than that the underwriters' patience has at last become exhausted. Some twelve years ago Pacific Coast fleets, generally, began to be covered in London with P. and I. insurance. From that time the owners have been laboring under the delusion that their troubles were over as far as protection and indemnity claims were concerned, and that the underwriters solely were carrying the burden. This, of course, is an economic fallacy because, after all, the underwriters only offer a medium to average the losses, at the same time insisting on a profit for themselves. In the last analysis the cost rests completely on the shipowner.

This sorry state of affairs has not occured without forewarning. Recent ominous rumblings from the underwriters have been occasioned by doubling, if not trebling, of accidents. The situation has grown worse steadily, and an upheaval has resulted which places the burden where it belongs—upon the shipowner. In the lull of the storm, however, are heard threats of more drastic action if the shipowners do not establish a diminution of casualties.

The place where the shoe pinches is in the matter of personal injury claims. These demands have been intolerable. Originally there was no deductible for personal injury claims either on wood or steel vessels; lately, however, nearly all steel vessels have had a fifty dollar deductible. On this year's renewals the insurances on wooden vessels were generally written with the old conditions but with an increased rate; while on steel vessels not only were rates raised (in some cases doubled), but occasionally a two hundred dollar deductible was enforced. Even the best placings provided a fifty dollar deductible on all personal injury claims.

There is a definite uneasiness among shipowners about this situation. The increases in rates are definite and this cost can be quickly computed, but when an owner is informed that his deductible has been increased from $50 to $200, he is quite at a loss to estimate the consequences. If he turns to statistics, the best figures are those of M. E. Arkills, safety engineer of the Waterfront Employers of Seattle. He has compiled personal injury costs for the ports of Puget Sound for the first half of 1925—and a total of 272 accidents incident to a payroll of $796,288.62. Classifying the costs, he gets the results shown in the table printed herewith.

These figures are based solely on longshore labor,

TABLE SHOWING CLASSIFIED COSTS OF LONGSHORE LABOR CASUALTIES AT SEATTLE FOR THE FIRST SIX MONTHS OF 1925.

Accidents	Number	Percentage	Cost	Percentage of Payroll
No cost	62	23.0	0	0
Under $ 25.00	110	40.5	$ 564.60	0.071
" 50.00	146	53.75	2055.72	0.258
" 100.00	209	76.75	6753.66	0.850
" 250.00	252	92.60	13,566.59	1.640
" 500.00	264	97.25	18,013.26	2.270
" 1000.00	267	98.25	20,076.42	2.530
Over 1000.00	5	2.75	34,975.50	4.38
Total	272	100.00.	55,051.92	6.90

while P. and I. insurance applies to the ship's crew as well. However, the fact remains that most of the P. and I. personal injury claims are those of longshoremen; therefore these data are particularly illuminating. In this connection it is to be noted that in some cases the longshoremen are employed by stevedoring companies and not by the ship, and thus would come under compensation policies rather than under the vessel's protection and indemnity insurance. Irrespective of who may be the employer, in the last analysis the shipowner is the one primarily involved, and this whole problem is the status of shipping labor whether on ship or on shore.

An obvious deduction from Mr. Arkills' figures is that a two hundred dollar deductible means that the shipowner will have to absorb approximately eighty-five per cent of the personal injury claims. This startlingly high average provides him with food for thought. He must face at once the problem of accident prevention. Here he becomes brother to the captain of industry who has been working out this problem for the past generation. Let him learn from the experience of his brother executive!

For the last twenty-five years the captain of industry has labored, through his industrial experts, with machinery, materials, and methods. The most modern drift, however, is the recognition of the economic value of human life. This recognition focuses the attention of the industrial executive on the well-being of his worker, for the worker is his chief asset. This is the page from the book of industry that our shipowner must now peruse.

One of the great principles established in industry has been that, both from the standpoint of profits and humanity, a study of accident causation and prevention is of supreme importance. In 1907 there were 35,000 fatal accidents and 2,000,000 cases of injury in the United States. In 1913 the number of fatal accidents had decreased to 25,000; and by 1917 it had dropped still further to 22,000. Although there was an increase during the munition work of the World War the rate is falling again. A similar decrease has taken place in the non-fatal cases. The reduction in this terrible toll of life has been due to the scientific study of safety methods and devices.

This reduction in accidents in industry has been accomplished only by the most unremitting care and constant study of the problem. The moment vigilance relaxes the casualties increase. This is strikingly illustrated by the case of one of the largest taxicab companies in the West. Several years ago they carried their own insurance. During this period they were most particular in their selection of careful drivers, their study of methods, and their constant examination of equipment. As a result their accidents were reduced to a minimum. At this juncture they received a favorable proposition from an insurance company and accepted it. The moment the insurance was placed they relaxed their safety work, and, as a matter of fact, the drivers then most in favor were the big producers of business. The result was that accidents quickly doubled. In spite of this situation, like the shipowner, they proceded upon the theory that the burden rested solely upon the insurance company. They were quickly disillusioned, however, for in a short time the underwriters raised their rates and eventually the policy was cancelled. The object lesson is that eternal vigilance is the price of safety.

In industry a close study of injuries has shown that their cause is generally not accidental, but obeys well established laws. They are most frequent during the hours of greatest fatigue, when the light is poorest, or when the worker is first employed. Formerly the fallacy prevailed that all work accidents were necessarily incident to industry, and that casualties were inevitable. Safety engineers now claim that seventy-five to ninety per cent of all accidents are preventable. This conclusion was reached by a careful study of accident causation. It was found that these could be grouped under equipment, methods, and men.

To remove these causes three means have to be considered. They are:

1—Inspection of physical conditions.
2—Supervision.
3—Education of the men.

With regard to the first factor, safety engineering experts assert that approximately thirty per cent of industrial accidents are preventable by means of safeguards.

Supervision involves two factors—first the perfection of factory management so as to reduce accidents and, second, the establishment of a staff to study, systematize, and administer accident prevention work.

Education is the keynote to safety because it develops the habit of cautiousness. Safety education has siezed upon the illustrative poster as a valuable means for disseminating caution amongst workers. Furthermore, accident tables reveal the incompetency of the new worker with his machine and emphasize the need of his thorough instruction in the technique of his "job."

In conclusion, industry has demonstrated that accident prevention is a paying investment. The most striking proof of this statement is revealed in the experience of the United States Steel Corporation. During a period of eight years it expended approximately $5,000,000 for the installation of safety devices and the adoption of accident prevention measures. As a result the accident rate was reduced forty per cent and their insurance premiums fell thirty-five per cent.

A striking parallel exists in that shipping is now encountering the same accident problem that industry has been solving for the past two decades. The Atlantic ports show almost no progress in an attempt at a solution of the problem; hence, insurance rates are high and still soaring. On the Pacific Coast some advance has been made in facing this issue.

Two years ago Vancouver, British Columbia, experienced a bitter waterfront strike from which the employers emerged victorious. As a result many new men were employed and, as an inevitable consequence, accidents multiplied and, as an inevitable consequence, pelled by humanitarian motives and a desire to reduce insurance rates, a year ago a safety engineer was engaged. In the short space of time that he has been employed the accident rate has been reduced between a third and a half.

In Seattle a more ambitious program has been carried out. A safety engineer has been employed for something over a year. Previously the problem was well on the way to solution through the energies of a cooperative association of employers and employees. This is known as the Joint Organization of Longshoremen and Truckers and Waterfront Employers of Seattle. One of the most striking results of their organization has been the decasualization of waterfront laborers. This achievement is highly important in that it means the elimination of the floater and the establishment of a group of experienced and reliable men. The proof of this decasualization is shown in that in January, 1921, the average wage for longshoremen was $58, while three years later the average varied from $140 to $175 per month.

In Seattle this amalgamation recognized the steadily advancing insurance rates to meet the ever increasing number of accidents. Its progressive and investigating spirit perceived the ratio between these two factors. At once it sought a solution in a trained safety engineer. His record has been one of attainment; in one year accidents have been reduced over twenty per cent.

One of the chief accomplishments of this safety engineer's work has been the classification of eighty-two causes of waterfront accidents. The value of this analysis lay in the light that it shed on the most preventable of the various causes. For instance, one single cause. "Wrong Orders," with its attendant 13,000 days' time lost, has been entirely eliminated. This was accomplished by making the hatch tender head of his gang and transmitting all orders through him. As a continuation of this safety program the educating poster has been featured and much inspection of gear, ashore and afloat, has been carried on.

These significant results at Vancouver and Seattle are handwritings on the wall and, taken in collaboration with the achievements of industry, definitely prove that the shipowner has a means for curbing insurance costs. The experience of others lies before him like an open book. Let him read.

Shipping on the Atlantic Coast

Special Correspondence from New York.

BELIEF is gaining ground in Washington that there is not much liklihood of the passage of any legislation effecting any radical change in the status of the Shipping Board and Fleet Corporation. The smooth functioning of the two bodies since the appointment of Captain Elmer E. Crowley to succeed Leigh C. Palmer as president of the Fleet Corporation is reported to have been very gratifying to the Administration.

Nothing further has been heard of the prospective resignation of Edward E. Plummer, the New England member. It has been suggested that Mr. Plummer may have been persuaded to withhold his resignation for the present in order to avoid embarrassment to the President. Philip S. Teller of San Francisco has been appointed to take the place left vacant by the resignation of Meyer Lissner, of Los Angeles. Several names have been put forward for Mr. Haney's place, among them are Harry Y. Saint, W. E. Gazzam, Marshall N. Dana, and Frank C. Shull, president of the Pacific Export Company. Mr. Saint and Mr. Shull are Republicans while Mr. Gazzam and Mr. Dana are Democrats.

The rapid progress made by the Board in disposing of services and individual ships during the latter part of 1925 and the promising outlook for disposal of others, including the American Oriental and Pacific-Argentine-Brazil lines has made many friends for the body. One disappointing feature of the sales has been the turning back to the Board of the American Palmetto Line service because the purchasers, the Carolina Company of Charleston, had found it impossible to reduce the deficit of the line to less than $10,000 per voyage. It is believed that the chief cause of this failure under private operation was the intense jealousy among the South Atlantic ports, which worked to the advantage of the competing lines, especially those operating out of Savannah.

Sales made by the Board during the calendar year 1925, were as follows:

Class—	No.	Tonnage	Amount Realized
Cargo	87	459,474	$4,232,229
Passengers & Cargo	8	104,129	6,801,000
Tankers	10	94,523	1,387,120
For scrapping	202	825,190	1,703,670
Concrete vessels	2	10,500	19,025
Tugs	13		549,500
Barges (wood, uncompleted)	1		12,500
Drydocks	2		80,000
Total realized			$14,785,044

The cargo vessels sold during the year included 33 steel ships, of deep sea types, 24 lakers, one sale for conversion to diesel drive, and 29 others for alteration or betterments.

Considerable headway has been made during the past month in reorganization of the Shipping Board and Fleet Corporation. All of the important vacancies in the latter have now been filled and salaries in each case are materially lower than those of the former incumbents. G. K. Nichols, has succeeded Hutch I. Cone as vice-president and special assistant to the president of the corporation and J. Harry Philbin has been appointed to succeed Sidney Henry as vice-president in charge of sales. In each case the salary has been reduced to $12,000 from $15,000. F. G. Frieser has been made director of traffic, succeeding W. B. Keene, and James A. Wilson has been made director of operations succeeding Asa F. Davison. The new appointees do not hold the rank of vice-president as did their predecessors and their salaries have been reduced to $10,000 from the former figure of $15,000. Warren F. Purdy has been appointed director for Europe at a salary of $15,000, succeeding Joseph E. Sheedy, who held the rank of vice-president with a salary of $18,000 a year.

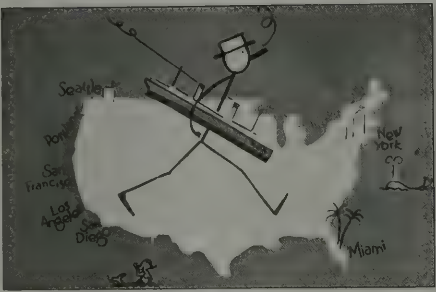
The big event of the past month in the intercoastal trade has been the announcement of the formation of the Interocean Steamship Company, headed by J. F. Schumacher, former New York manager for the Dollar Line and later assistant traffic manager of the Export Steamship Corporation. In addition to its operation of eight ships in the intercoastal service, the company will have the agency for the American Export Line at Philadelphia, which was formerly held by the International Freighting Corporation.

The recently organized Houston-I. F. C. Line announces its first sailing in the North Atlantic-South America freight service with the steamer Hesperides,

(Continued on Page 58)

Pacific Coast Crack Liner H. F. Alexander Making New Records between New York and Miami

SINCE October 22, 1925, the steamer H. F. Alexander has been making regular sailings every five days from New York to Miami; forty-six hours on the outward trip against the Gulf Stream, forty-two hours return with the Gulf Stream assisting. This vessel, the crack trans-Atlantic American transport during the late war, the crack Pacific coastwise liner before and since the war, and at all times since her debut in 1915 the "largest, fastest, and most luxurious" coastwise vessel in the world, is now making new records on the great marine way to Florida's wonder city.



The Admiral on his way—and he knows where he is going.

Much publicity has been given to the promotion schemes for establishing floating hotels to relieve the shoreside shortage at Miami and other Florida ports. Here is the finest floating hotel on the sea, making better time between Florida and New York than is called for on any railroad schedule. No great promotion needed either—only the quick recognition of a good opportunity to give excellent service where such service was in great demand. Both H. F. Alexander, president, and E. G. McMicken, general passenger agent of the Admiral Line, recognized this opportunity in the summer of 1925 and just as soon as arrangements could be made, E. G. McMicken, figuratively speaking, with his crack passenger liner under one arm and a good stock of stogies and circulars under the other, stepped across the continent and captured the cream of the winter travel from Gotham to Key West.

There is nothing else on that route or any similar coastwise route that compares with the H. F. Alexander. Her comfortable home-like elegance, her great speed, her spacious decks, backed by Admiral Line service, make a combination hard to beat, and it is small wonder that she should be booked to the limit for weeks ahead of each sailing date.

As operated under the Admiral Line, this great liner is in all its appointments very similar to a first class hotel ashore. An intercommunicating telephone switchboard service connects with each stateroom and operators are on duty night and day. When at dock this switchboard has a shoreside connection so that up to a few minutes of sailing time connection can be had with the homes or offices of friends ashore.

Valet, bath, baggage, and general stateroom service is almost precisely identical with that of the best hotel service ashore. A fine children's playroom, fully equipped and with competent matron in charge, is maintained for the convenience of the passengers. Bell boy service, day and night, from the central office is identical with that of metropolitan hotels.

In short, the H. F. Alexander is different. Different in her atmosphere of cordiality and hominess. Different in her smooth efficiency. Different in her greyhound speed.

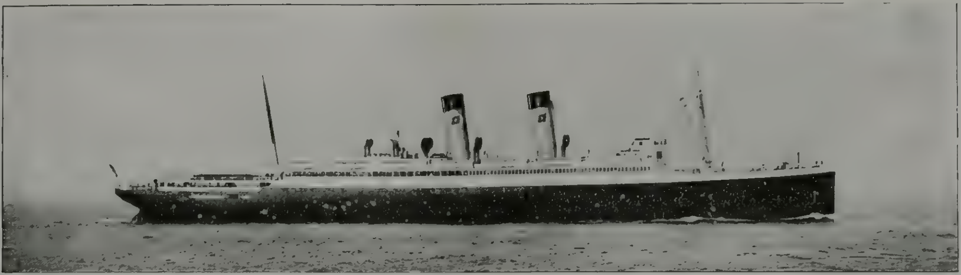
In the forward tween decks space and on the upper deck forward there is ample room for 100 automobiles

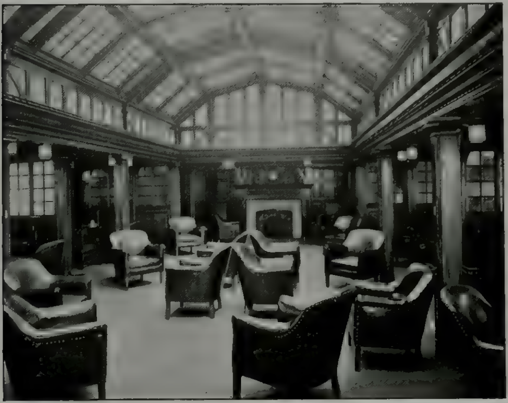
H. F. Alexander, president, Pacific Steamship Co.

THE ADMIRAL LINE.

The famous passenger service of the Admiral Line on the Pacific Coast, operating from Seattle to San Diego, Los Angeles and San Francisco, has been built up largely by the genius for organization, publicity and salesmanship of H. F. Alexander, president of the Pacific Steamship Company, and E. G. McMicken, general passenger agent. This genius, recognizing an opportunity, has now invaded the shipping metropolis of America, placing its best ship on the run from New York to Miami. At the present writing this venture is a great success, and fully justifies the wisdom of its promoters.

E. G. McMicken, general passenger agent of the Admiral Line.



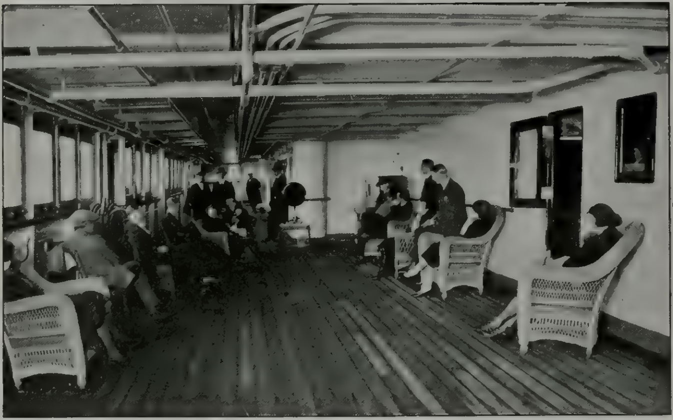


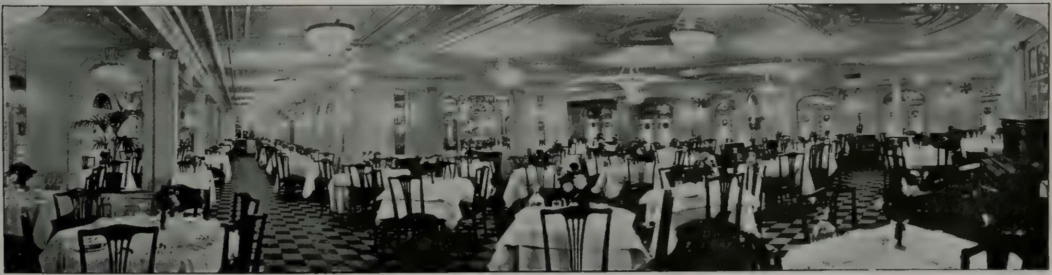
and these are carried at very reasonable rates for passengers, thus enabling tourists to have a delightful sea trip and carry their land transportation facilities along with them.

The executives of the Admiral Line are to be congratulated on their shrewd business acumen in seizing this opportunity to use their best ship to the best commercial advantage. The use of the H. F. Alexander in this Atlantic coastwise service will probably raise the standards of coastwise sea travel there so that the demand will bring much fine work to American shipyards. Her absence from her regular Pacific coastwise schedule has already raised quite a demand for her return or for an equivalent service, and that also will tend to make business for American shipyards.

H. F. ALEXANDER

The views on this page give some slight idea of the comfortable elegance of appointments of the Admiral Line steamship H. F. Alexander. At the top is shown a broadside view of this fast liner, making 22½ knots an hour running out of San Francisco harbor. The view next below gives an idea of the spaciousness and comfortable appointments of her smoking room. At the right is shown the spacious promenade deck, glass enclosed, with ample room for outside deck sports, dancing and lounging in deck chairs. At the bottom of the page is shown a panorama of the beautiful dining saloon. This room, finished in ivory enamel with mahogany trim and luxuriously carpeted, is one of the finest dining rooms afloat. It easily takes care of the full complement of passengers at one sitting. The schedule time of the H. F. Alexander on the New York-Miami run calls for 21 knots southbound and for 23 knots northbound. We believe that this steamer maintains a faster schedule than any other commercial vessel under the American flag.





Shipping on the Atlantic Coast

(Continued from Page 55)

sailing from New York, January 30, to be followed at intervals of about two weeks by the Halesius, Vestvard, and Murjec. Officers of the new company are: Harry J. Lesser, president; J. Hinton Graves and Alfred Neale, vice-presidents; and Irving L. Ernst, secretary and treasurer. Sailings are to be made from both United States and Canadian ports and it is reported that some new tonnage built especially for this service will be added later on.

In the meantime the managing agency of the American Republics Line from which the International Freighting Corporation asked to be relieved, has been assigned to Moore & McCormack, commencing February 1. It had been expected that this line would be offered for sale by the Shipping Board and that both the Munson and Barber Lines would be bidders for the service; but it is now understood that the Board plans to defer advertising the line for sale until it has been definitely proved to be self-sustaining. It is understood that several of the dieselized ships which are to be ready for service in a few months will be turned over to this line in order to enable it to meet the competition of other lines operating motor tonnage in the same trade.

Another important development of the month has been the acquisition of the American-South African Line of the Shipping Board by John M. Franklin, representing a group of officials of subsidiaries of the United States Steel Corporation, including James A. Farrell, Jr., vice-president of the Seas Shipping Company; Arthur R. Lewis, president of the American Cuban Steamship Line; Ralph G. Farrell, president Bridgeport Screw Company; and Capt. Thomas G. Sartor of the Argonaut Line, of which Mr. Franklin is general manager. The American South African Line has been incorporated under the laws of New York with James A. Farrell Jr. as president, and it is announced that the first sailing under the flag of the new company will be the West Isleta, leaving New York, January 28, for South and East African ports. It is believed that the entry of this new combination into the South African trade under the American flag will mean a larger proportion of both inward and outward cargoes for the American ships than it was possible for the former operators of the service to secure. Steel products are the most important item in the outward cargoes and a large volume of ore tonnage is expected to be brought in from South Africa.

The price paid for the five freighters in the South African service averages $18.10 per deadweight ton. The world market ranges from $24 to $28 a ton. The prices for the individual ships were: Western Glen, $154,474; Western Ally, $154,103; Western Hawthorne, $154,827; Western Islet, $158,230; and Western Night, $156,384, a total of $782,000. The next best offer was that of the Barber Steamship Lines of $454,249 for five ships of tonnages equivalent to the five mentioned. A. H. Bull & Company, operators of the service, did not bid.

The New York & Cuba Mail Line, better known as the Ward Line, after operating for the past eight years in the trade between New Orleans and other Gulf ports and Cuban and Mexican ports, has decided to withdraw its ships from this service and to concentrate on its passenger and freight services between New York and Cuban and Mexican ports. The withdrawal from the Gulf trade is stated to have been brought about by the fact that the trade is greatly overtonnaged, with no immediate prospect of relief. The company, which has made excellent progress during the past year, is contemplating the addition of new tonnage to its Cuban service.

An indication of improved conditions in the intercoastal trade is seen in the action of the directors of the Garland Steamship Line in declaring a $3 dividend on the preferred stock representing accumulated dividinds from December 1, 1922 until May 31, 1924.

It is taken for granted that strong representations will be made before Congress to induce members of both Houses to agree to an increase in the appropriation for the next fiscal year from the figure of $14,198,574 recommended by the Budget Bureau. The Board had previously suggested $22,000,000 as the minimum. Belief has been expressed that a compromise may be arranged on the basis of the estimate of $18,000,000 suggested by Leigh C. Palmer while he was president of the Fleet Corporation. Last year's appropriation was $24,330,000.

Pacific Foreign Trade Council

ON MARCH 4, 5, and 6 next a very important convention will be held in San Francisco at the call of the Pacific Foreign Trade council. The keynote of this conference will be **Pacific Coast Unity for World Trade Expansion,** and in additoin to a very fine program of addresses by qualified experts, group sessions will be held for the discussion of outstanding special problems.

It will be the first time that the Pacific Foreign Trade Council has held a convention in San Francisco, and the event is attracting the attention of trade experts throughout the Pacific Coast territory. The sessions will be held at the Hotel Whitcomb, and will be attended by nationally-known trade experts and observers from throughout the United States and foreign nations. The San Francisco Chamber of Commerce is cooperating in arranging for the convention through its Foreign Trade department, headed by Henry F. Grady.

Virtually every phase of foreign trade development will be discussed at the convention. The preliminary list of speakers includes the names of Ralph Merritt, president of the Sun-Maid Raisin Growers' Association; Mayor James Rolph; J. J. Donovan, president of the Bloedel-Donovan Lumber Mills, Bellingham, Washington; A. F. Haines, vice-president of the Admiral-Oriental Steamship Line, Seattle; E. H. Sensenich, Portland; Dwight K. Grady, secretary of the Dried Fruit Association of California; Julean Arnold, Pekin, China; Paul Shoup, vice-president of the Southern Pacific Company; Robert Newton Lynch, vice-president of the San Francisco Chamber of Commerce; Dean Stuart Daggert of the School of Commerce of the University of California; I. F. Laucks, Seattle; J. A. H. Kerr, vice-president of the Security Trust and Savings Bank, Los Angeles; and Irving E. Vining of Ashland, Oregon, president of the Oregon State Chamber of Commerce.

The Airship in Commerce

An Interesting Discussion of the Practical Possibilities of Lighter-than-Air, Self-Propelled Craft

FORECASTING the future is always a fascinating occupation, more fascinating perhaps in the field of aviation than in any other. At the last annual meeting of the American Society of Mechanical Engineers, held in New York, November 30, 1925, Lieutenant-Colonel H. H. Blee of Santa Ana, California, contributed a very interesting and carefully prepared paper on "The Airship and Its Place in Commerce." After tracing the historical development of the airship and discussing in considerable detail the various factors which enter into the design and construction of the hull and of the engine, the author takes up the question of the airship in commerce as follows:

The airship and the airplane possess characteristics which give to each certain advantages over the other, characteristics which cut out for each a very definite service in the sphere of commercial aeronautics.

The airship has a much greater non-stop cruising radius than the airplane; the most efficient distance between ports of call for the commercial airship, allowing a 50 per cent fuel reserve, being from about 2000 to 4000 miles, depending upon the size of the ship and upon traffic and operating considerations. In the case of the commercial airplane this distance ranges from about 300 miles to possibly 600 miles. Between points of call on the airplane route, or airway, must be located suitably marked emergency landing fields for use in case of forced landings. On the United States Air Mail routes, particularly where night flying is to be done, these emergency landing fields are located at approximately 25-mile intervals through the flatter, more open country, and at 10-mile intervals through hilly country where natural landing fields are difficult to find.

The airship can carry much heavier loads than the airplane. It can reduce its air speed to zero and still remain in the air; and it can travel and land in fog, snow storm, and night with a greater degree of security than the airplane. Furthermore, with this ability to remain in the air when not under power and with its relatively large number of heavy duty power plants, all of which are completely accessible during flight and operate under the continuous attention of skilled motor mechanics, the airship offers a greater degree of safety and reliability. Another point in favor of the airship is that it affords greater freedom of movement and comfort to its passengers, offering far more commodious and convenient accommodations, free from noise and vibration, for travel either by day or by night. The provision of suitable sleeping accommodations for passengers on airplanes, of the present type at least, is quite a serious problem and materially reduces the number of passengers that can be carried.

The airplane, on the other hand, travels with much greater speed than the airship and is very easily housed. Being of smaller size it is cheaper to construct and to maintain, which makes possible the establishment of commercial airplane lines, on a moderate scale at least, with a much smaller initial investment than is possible with airships.

For airships of similar form the horsepower required, and hence the total weight of power plants, for a given speed varies as the two-thirds power of the maximum gross lift, since the maximum gross lift varies directly as the total volume. Hence, with increase in size there is a decrease in the ratio of the total weight of power plants to the total lift of the ship. For a given speed and cruising radius the pay load increases quite rapidly with increase in size up to a certain point, given by G. A. Crocco (see N.A.C.A. Technical Memo. No. 274) as about 1000 metric tons total lift, beyond which point there is very little increase In the case of the airplane the lift-drag ratio has a tendency to decrease with increase in the size of the plane, which means that the drag increases at a somewhat more rapid rate than the lift. Hence, for a given speed the horsepower required tends to increase more rapidly than the lift with increase in size of the plane. The ratio of the useful load to the gross lift of the airplane increases with increase in size up to a certain limit and then begins to decrease. Prof. E. P. Warner, in his article on "The Limiting Range of Airplanes," places this limit at a gross weight of about 10,000 pounds.

On account of the differences between the characteristics of the airship and the airplane, the future development of commercial aeronautics will be divided into two distinct branches, as follows:

(1) Large rigid airships carrying heavy loads of passengers, mail, and express on very long non-stop flights, particularly over transoceanic and combination transoceanic and transcontinental routes, where the saving in time over surface transportation will be a maximum, with terminals and ports of call at the great traffic centers of the world.

(2) Airplanes carrying lighter loads of passengers, mail, and express at higher speeds over routes which can be procured with a system of intermediate landing fields interspersed with a chain of emergency fields. Some of these airplane lines will operate as feeders and distributers for the airship lines, while many will operate entirely independently.

The smaller type of airship, either non-rigid or semi-rigid, is well suited for long distance reconnaissance, photographic, and forest patrol missions over rough mountainous country where no landing fields are available and where it may be desired to fly very slowly at times, or even hover over certain sections, in order to make a careful study of the terrain, as in railroad and transmission-line location, water-power developments, etc.

The Army Air Service has been doing experimental work both with the idea of using airships as airplane carriers and of using airplanes for carrying mail, express, and even passengers to and from the large commercial airships in flight as they speed over important cities on their long non-stop flights. The maneuver of picking up an airplane in flight in mid-air, carrying it, and launching it again was accomplished for the first time by the Army Airship TC-3 on December 15, 1924, at Scott Field. The test was made at an altitude of about 1500 feet, and at an air speed of 60 miles per hour. The plane, a Sperry Messenger, flew up under the ship, made contact, and was carried 10 or 15 miles before launching away. The test was entirely successful, and is undoubtedly a forerunner of some very practical developments.

The British Government now has under construction two commercial rigid airships, each having a gas displacement of 5,000,000 cubic feet—approximately twice that of the Los Angeles. According to data published in current European and American aeronautical journals, each of these ships is to have a length of 695 feet, a maximum diameter of 132 feet, seven 550-horsepower engines, a maximum speed of 80 miles per hour, a cruising speed of about 65 miles per hour, and accommodations for a pay load of 120 passengers as well as 10 to 15 tons of mail and express. In addition to commodious passenger cabins, there are to be provided a social hall, smoking room, excellent dining facilities, and quarters for a crew of from 35 to 40 men, including cooks and stewards. Since hydrogen is to be used as the lifting gas, the Ricardo kerosene-cum-hydrogen fuel system is to be employed, the passenger quarters are to be separated from the rest of the ship both by gas-tight walls and by a free air space, and it is reported that cooled exhaust gases from the engines are to be circulated through the trunks from the gas valves. The contract price for these ships is given as £350,000 ($1,680,000) each. They are to operate between England and Australia, stopping en route in Egypt, India, and Java—the total distance of some 12,000 miles to be covered in 11 days, whereas the time required for this journey by ocean liner is from 32 to 36 days.

The Los Angeles, the most modern airship in the air today, has accommodations for from 24 to 30 passengers and from 2 to 2.5 tons of mail and express, the total pay load being about 6.4 tons. The passenger compartments and conveniences are comparable in many ways to those to be found on a standard Pullman car. The ship is equipped with radio sending and receiving apparatus, is electrically lighted throughout, and, in addition to a mechanical signal system, has a telephone system connecting the control car with the important operating stations. When using helium as the lifting gas and cruising at a speed of 57.5 miles per hour with a pay load of 6.4 tons, the Los Angeles has a maximum radius of 3450 miles, which, on the basis of a 50 per cent fuel reserve, gives a commercial cruising radius of 2300 miles. A number of commercial routes have been suggested for this ship, one of which is the New York-London route, going via Newfoundland and Ireland and returning via the Azores and Bermuda, thereby taking advantage of prevailing winds; other suggested routes are the New York-Panama and the Los Angeles-Honolulu.

Cost Considerations.

The cost of airship construction depends upon a number of conditions, such as the size and number of ships to be built, the facilities available for carrying on the work, previous experience in airship construction, and the labor and materials market. On a gas displacement basis this cost ranges from about $0.35 to $1.50 per cubic foot. While the actual cost of the Los Angeles to the German government has not been made public, it is estimated that it was approximately $1,000,000, which on a gas displacement basis represents a cost of $0.384 per cubic foot. The contract price on the new 5,000,000 cubic foot British ships is $0.336 per cubic foot. According to testimony given before the Naval Appropriations Sub-Committee by Rear-Admiral Wm. A. Moffett, Chief of the Bureau of Aeronautics, the Navy could construct a single experimental rigid airship of 6,000,000 cubic feet gas capacity at a cost of $1.00 per cubic foot, and by constructing four such ships the cost would be reduced to one-half that amount. The Shenandoah, the first rigid airship to be built by the Navy Department, cost about $1.37 per cubit foot.

Regarding the rate of depreciation of commercial airships operating on regular scheduled service, the data available are very limited. It is known, however, that rigid airships put into service on commercial lines in Germany in the year 1910 were still in operation in 1914, when the war broke out; hence, it would seem safe to assume a useful life of four or five years, if not longer.

Little information is to be had at the present time concerning the actual cost of operating airships on a commercial service. The German Air Transport Company, which operated four 30-passenger hydrogen-filled Zeppelin airships on regular service for several years before before being stopped by the war, again inaugurated, in 1919, a commercial line operating the Zeppelin airship Bodensee, with accommodations for thirty passengers, on a regular passenger and mail service between Berlin and Friedrichshafen. This line was soon forced to discontinue, under the terms of the Versailles Treaty. So far as the author has been able to learn, no data regarding the operation of these ships have been made public other than that some 35,000 passengers and many tons of mail and express were carried without accident or loss of life; it does not seem likely that such service would have been resumed had it not proved profitable.

Dr. Hugo Eckener, who commanded the Los Angeles on her flight to the United States, estimates that on a direct New York-London service with three ships (one in reserve), each having accommodations for 30 passengers and 10 tons of mail and express, making a total of 100 crossings per year and reducing the time of travel to from one-half to one-third of that required by ocean steamers, the fare charged would be $600 per passenger. H. B. Pratt, Chief Engineer, Airship Department, Vickers, Ltd., in his book, Commercial Airships (1920), gives a detailed estimate covering a similar service over this 3500-mile route. His estimates, which places the charges somewhat lower than those given by Dr. Eckener, contemplates a service making 104 crossings per year, using three ships (one in reserve), each with accommodations for a pay load of 100 passengers and 10.5 tons of mail and express, and making the trip in from 50 to 60 hours. On the basis of carrying 83 per cent full load and paying a net profit of 10 per cent on a total investment of $12,000,000, he derives the following charges:

Per ton from London to New York	$2,760.00
Per ton-mile	0.79
Per passenger from London to New York	369.60
Per passenger-mile	0.105
Per ounce of mail matter	0.08
Per pound of mail matter	1.28

Conclusion.

Although considerable experimental and development work still remains to be done to bring the large rigid airship to the highly developed state of the ocean liner, nevertheless, within the course of a few years this type of airship, especially when using helium as the lifting medium, will be classed as a safe, reliable, time-saving, comfortable craft, admirably adapted to carrying heavy loads of passengers, mail, and express on profitable commercial service over long non-stop flights. When augmented by the proper ground organization, including terminal facilities, mooring masts, radio stations and meteorological service, the rigid airship will be capable of maintaining regular scheduled service to any part of the globe.

The United States enjoys the unique position of having, as one of its natural resources, an abundant supply of helium. This gives us a great advantage over the other countries of the world in the operation of airships, both as commercial carriers and as instruments of national defense. At present we are wasting this valuable asset at an appalling rate, the estimated annual waste being 500,000,000 cubic feet. How long this supply will last we do not know. We do know that it cannot be expected to continue at this rate indefinitely, and that all reasonable steps should be taken to safeguard and conserve the supply.

The airship and the airplane are fitted by the characteristics peculiar to each for service in separate fields of the sphere of commercial aeronautics. Each has its own particular mission to perform and its own contribution to make toward the advancement of civilization by shortening distances and bringing the world closer together. The two types of aircraft must work together, each receiving the hearty cooperation and support of the other, if commercial aeronautics is to render to society its full measure of service.

Maritime Legislation

The Opening of Congress Brings the Usual Deluge of Regulatory Measures Proposing to Cure America's Maritime Ills

THE opening of Congress has brought the usual flood of proposed legislation and many of the bills are of great interest to American shipowners and operators.

Congress has received the report of its special committee on investigation of the Shipping Board. This report recommends among other things:—

Board control,
Charter operation,
Sales of routes and vessels at less than market prices on guarantee to maintain service,
No scrapping of ships,
Idle fleet to be either held in commercial reserve by Shipping Board or in military and naval reserve by Army and Navy,
American citizens for foreign representation Fleet Corporation,
No representation of foreign steamship lines by Board operators,
Uniform simple bill of lading,
Free Ports,
Load line legislation,
Liberal mail subventions,
No straight subsidies,
Removal of restrictions on railroad ownership and operation of vessels in foreign trade,
Repeal of tariff duties and all restrictions on imported shipbuilding materials.

After That the Deluge.

There is enough in this report alone to keep the committees of the House and of the Senate in material for discussion lasting an entire session; but in the wake of the report comes a deluge of bills, the more important of which are very briefly summarized in the following paragraphs.

Shipping Board.

The Jones Bill (S. 1384) would make the Emergency Fleet Corporation a permanent body to take over ownership, operation, control, maintenance, repair, insurance, and disposal of all vessels, docks, equipment, wharves or other physical property. No shoreside property to be sold without consent of Congress. No present service to be discontinued or curtailed except under approval of Board and the President. Board to function as an investigative and regulatory body.

Lehlbach Bill (H. R. 5369) proposes same as Jones Bill and adds some changes in respect to Section 28 of the present Merchant Marine Act and a large variety of other matters.

Edge Bills (S. 35 and S. 36) would abolish Shipping Board; transfer everything to Emergency Fleet Corporation and give President free hand to reorganize all executive agencies of government.

Fairchilds Bill (H. R. 56) would impose 5 per centum ad valorum discriminating duty on all goods imported in foreign bottoms; tonnage dues of 6 cents on American vessels; 30 cents on American-built foreign-owned vessels; and 50 cents on all other vessels.

McKellar Bill (S. 679) would abolish Fleet Corporation; transfer everything to Board; continue government operation; provide for discrimination in tariff duties; and other indirect aids.

Colton Bill (H. R. 5395) would transfer Fleet Corporation to War Department and put all services under same type of control as Panama Steamship Company. There would be three corporations (Secretary of War sole stockholder)—the Panama Line, controlling all Latin-America services; the Pacific Transport Service, controlling all trans-Pacific and Oriental services; the American Fleet Corporation, controlling all trans-Atlantic services. Secretary of Commerce to be custodian of all vessels not needed for these services; he to sell or charter on terms outlined; ten years of direct aid on a diminishing scale to be given purchasers.

White Bill (H. R. 5038)—the ten year old measure requiring vessels to carry patented life saving suits.

Immigration Legislation.

Representatives Johnson (H. R. 344) and Holaday (H. R. 3774). Two bills practically of same tenor, providing that nonadmissible aliens employed on vessels arriving in United States shall be deported in vessels other than those on which they arrive. Penalty for refusal by steamship companies to deport increased from $300 to $1000, with possible forfeiture of vessel and prohibition from landing passengers at American ports. Hospital expenses of alien employees to be up to steamship companies without deduction from wages.

These two bills are evidently meant to saddle the shipowner with additional burdens and should be carefully watched in committee. In addition to these there are many other bills, some tightening and some loosening the restrictions and affecting in other ways whole question of immigration and its effect on the economic policies of America.

Miscellaneous Bills Affecting Shipping.

Representative Dickstein (H.R. 3759) seeks to place all telegraph, telephone and cable companies, wire or wireless, under jurisdiction of Interstate Commerce Commission.

Senator Free (S. 91) reintroduces his ammendment to the Bills of Lading Act.

Senator Fletcher proposes as ammendment to H. R. 1 (the Administration Revenue Revision Bill) that passenger tickets to Cuba be exempt from stamp tax as well as those to Canada and Mexico (now exempt).

A Bureau to be known as Foreign Commerce Service is proposed to be established in the Department of Commerce by Representative Hock (H. R. 3858).

Foreign Trade Zones in United States ports would be provided by S. 66, Senator Jones and by H. R. 37, Representative Briggs.

Senator Jones (S. 1268) would place supervising inspectors of the Steamboat Inspection Service under Civil Service rules.

La Follette Bill.

Young La Follette is carrying on the work of his deceased father in a proposal (S. 1079) that would tighten the grip of union seamen on merchant marine operation. This bill provides for a continuous discharge book which shall contain only description, age, nationality, and signature—no photographs or character notations. Other discharge books are prohibited.

The bill would also amend Section 4530 so as to permit seamen to demand their wages at ports where the vessel takes on fuel and abolish the limitation that demand for wages may not be made oftener than once in five days.

Coastwise vessels and vessels operating on the shorter runs would also be required to sign on their crews before a shipping commissioner, and also vessels on the Great Lakes touching at foreign ports. It would also forbid the signing on of crews of American vessels in foreign ports on voyages to the United States and return.

Another section, which is commonly referred to as the walking delegate section, has been added which would permit the seamen to call any person to read and explain the shipping articles to them and forbids the signing on or paying off of crews unless the vessel is directly connected to the shore by a gangway.

According to the bill nothing in Section 92 of the Criminal Code should be "construed as to make it unlawful for the crew or any person or persons part thereof to leave the vessel when in a safe harbor unless such vessel is not moored and in motion; nor if such crew, having completed the time for which they were shipped, peaceably remain on board without working, waiting payment of wages then earned and not paid."

Another bill proposed by Senator Jones should be carefully watched by shipowners in that it would transfer from the Department of Commerce to the Department of Labor the power and duty to enforce so much of the navigation laws and laws governing the Steamboat Inspection Service as relate to persons employed in seafaring occupations and thereafter such laws would be administered by a division to be established in the Department of Labor to be known as the Division of Marine Occupations. The measure would also require the crews in the lake-going trade, or in trade between the United States and British North America, or in the trade with the West Indies and Mexico, or in the coastwise trade to be shipped before a Shipping Commissioner; and would forbid the signing on of crews of American vessels in foreign ports on voyages to the United States and return. Continuous discharge books containing the holder's name, description, and photograph, together with a statement of sea experience, which contents are to be inserted by the Immigration officials, would be furnished seamen by the Department of Labor. No mention of prohibiting the use of other discharge books is made in the bill.

Welding on Boilers

By S. W. MILLER

Past President of the American Welding Society.

IN VIEW of the ever-widening applications of fusion weldng throughout industry and the probability that repairs to boilers made in this way will be proposed from time to time, it is well that those responsible for the results should bear several points in mind. For simplicity, these are listed briefly below:

1. Most boilers are insured;
2. Many boiler insurance policies are so worded that if repairs are made without the authority of the company carrying the insurance, the policy becomes void;
3. There are federal, state, and municipal regulations governing this work, as well as those issued by the insurance companies;
4. Only competent welders, used to boiler work, should be allowed to do the welding.

Therefore, the following precautions should be observed by the owner or his representative:

1. Examine the part of the boiler to be welded in company with the insurance company inspector, and get his approval before doing any welding;
2. Be present with the inspector at the test after welding.
3. If possible, get the inspector to sign a statement that the work has been properly done, and that it has passed the test successfully;
4. If the boiler is not insured and comes under federal, state, or municipal supervision, carry out the above program in company with the proper authority.

If the boiler is neither insured nor under supervision of some constituted authority, ample precautions should be taken by the welder and the owner to protect themselves against possible future trouble. They should make a sketch of the location and size of the repair, with a clear statement of what was found wrong and how the repair was made. They should always make a hydrostatic hammer test of the finished job, using a pressure of $1\frac{1}{2}$ times the working boiler pressure, in the presence of witnesses, and get their signature to a statement of the facts. These papers should be carefully filed away. In such a case, no welding would be done which is not permitted by law.

In case of marine work, the welder should pass the regular examination of the Federal Steamboat Inspection Service.

In all cases, the welder should make friends of the insurance and other inspectors by refusing to do work unless authorized by them, by being conservative in what work he recommends, and by doing nothing except a first-class job.

South Pacific Shipping

Special Correspondence from Australasia

WHAT threatened to become a first-rate war failed to materialize when Japanese lines, after running three trips in the Australia-United Kingdom trade, withdrew owing to insufficient permanent support. The Japanese pay the lowest rates of wages to crews of all the various nationalities trading to Sydney, and their freights are based accordingly. Most of the ships on the Australian-London run, whether British, Norwegian, Danish, German, Swedish, Italian, French, or Dutch, are manned by Europeans. The lowest pay is $22 a month and the highest $45. But the Japanese cut in with $12 a month, and for a time it looked as if trouble was in the air. However, they could not stay in.

The Japanese lines hold their own in the Sydney-China trade, or to be exact, the British hold their own in that trade with the Japanese because colored crews are employed on all the lines and freight rates are the same.

More New Ships.

Every month sees a new steamer arrive at Sydney to engage in coastal, eastern, or ocean trades. The new Otranto for the Orient Line is named after a predecessor lost in the war. She is a vessel of 21,000 tons, length 658 feet, beam 75 feet. She has two Parsons turbines developing 20,000 horsepower, and uses oil fuel. Her arrival in Australian waters will mean that three ships of this class will be running for the Orient Company, the others being the Orama and Oronsay.

Another recent arrival is a 4500-ton motorship, the Malabar. She is one of the Burns, Philp Company's fleet on the Sydney-Singapore-China run. Her length is 360 feet, beam 48 feet 6 inches, molded depth 25 feet 3 inches. Accommodations are provided for 163 passengers, in one, two, and four berth cabins. A feature is an auxiliary dining saloon on the upper deck. On her trial the Malabar ran at a speed of 14 knots. Owing to the company's Marella being damaged at Singapore, the Malabar, which was on her way out from England, was put into commission to carry on the Marella's return trip, instead of going through to Sydney to be commissioned.

The Union Steamship Company continues to launch motorships. A very fine freighter is the Limerick. She replaces the Armagh, which was lost in the Mersey; while the oil tanker Otokia takes the place of the Orowaiti, which was lost at San Luis Obispo in 1924. Motorships are becoming a familiar sight in Australasian waters, many of them being owned by Scandinavian lines. These owners, however, sacrifice looks for economy, and Australians do admire a large vessel with all a steamer's rig and appearance except the smoke stack. Only the American and the Britisher seem to keep up appearances in equipping motorships with stacks.

Australian Government Steamers.

Government ownership of steamers has always been a matter for discussion. Several of the states tried the experiment, and practically all have given up the shipping business. The Commonwealth, however, has stuck to its fleet, though the numbers have diminished from what they were during the war, when Prime Minister Billy Hughes bought a fleet to insure the speedy carriage of Australia's produce to the world's markets. Originally the number of steamers was 53, now it is 22. But the modern Commonwealth fleet consists of steamers of a good class. Within the last twelve months a committee set up to report, advised the Government to sell this fleet, claiming that the ships could never be profitable due to the fact that they paid the Australian rates of wages while its competitors paid only one-half or one-third of that rate. Some of the poorer vessels were sold, but the passenger boats and the best of the freighters were retained. During the recent shipping strike, a number of Commonwealth line boats which were laid up, were recommissioned and sailed with wool for Europe.

Aberdeen Centenary.

It reminded Australians that they "are getting to be big boys now" when the Aberdeen Line celebrated its centenary recently. True, the line has not been trading to Australia for one hundred years, but it has been doing so for eighty-five years, and to New Zealand for eighty-three years. The company's first steamer was the Aberdeen, which ran to Australia in 1882. Its clippers were well-known long before that, including the Thermopylae, which once out-sailed the famous Cutty Sark.

AN AUSTRALIAN COASTER

Australian shipowners have recently been building a number of motorships. One of the latest of these is shown in the accompanying illustration.

This is the motorship Mulcra, of the Adelaide Steamship Company, Adelaide, Australia. She was built by the Svendborge Shipbuilding & Machinery Company, of Svendborge, Denmark, and engined by Burmeister & Wain of Copenhagen.

She is 225 feet over-all, 34 feet beam, 14 feet 6 inches molded depth, and has a deadweight carrying capacity of 1450 tons.

Pacific Port Construction Program

The Port Program on San Francisco Bay

Last month in this section of Pacific Marine Review we outlined the program of port construction in the near future for Tacoma, Victoria, and Portland. This by no means exhausts the port development projected for the Pacific Northwest and we shall return to that section in some future issues. We are giving here a little of the work ahead for the San Francisco Bay region.

The article on the Sacramento River work is of special interest because, while it is true that the Sacramento ship canal may not be built for many years, the impressive figures shown as to the present volume of commerce on this river indicate the necessity for much terminal work in the immediate future.

The Oakland project has passed the preliminary stages of engineering design and of public financing, and work will be progressing upon this ten million dollar improvement without delay. It should be of great interest to manufacturers of materials handling devices that such devices are recommended by the Board of Engineers with especial emphasis on the use of tractors, trailers, and stackers.

The board of State Harbor Commissioners, who control the port of San Francisco, also have a six million dollar program of improvements and betterments, for which funds are available and on which the work will be prosecuted immediately. The full details of this program, together with plans of piers and other structures, will appear in an early issue of Pacific Marine Review.

The ports of Los Angeles, Long Beach, and San Diego each has an ambitious program of extension and betterments which is being actively prosecuted at the present time. The same is true of practically every port, large and small, on the Pacific Coasts of North and South America and in the majority of ports on the Pacific Coasts of Asia and Australasia. We are indicating these facts with the thought that they should be of great interest to the builders and distributors of materials handling machinery.

The Sacramento River Project

ONE, and perhaps the most important, of the factors that combine to place San Francisco Bay among the world's greatest seaports is the inland waterway made by the combined Sacramento and San Joaquin Rivers, which bring the products of the great inland valley down to the harbor on a great fleet of river boats and barges.

Special attention is being directed toward these rivers at the present time by agitations for a deep-water ship canal to Sacramento and a deep-water channel to Stockton; and it is thought that the following data, taken from an article in "San Francisco Business" for December 9, 1925, by S. J. Richards, manager, Sacramento Chamber of Commerce, and from engineers' reports, will be of great interest.

Sacramento River Data.

Theoretically the Sacramento River is navigable from Collinsville, where it empties into Suisun Bay, to Red Bluff, a distance of 250.6 miles. But the channel has become so filled up that the present head of navigation is Colusa, 146.9 miles from the mouth. According to the 1920 Federal census, the average annual value of farm products in the watershed counties of the river was $122,387,117, divided as follows: Cereals, $52,327,248; other grains and seeds, $7,774,418; hay and forage, $20,107,242; vegetables, $5,611,832; fruits and nuts, $33,391,297; all other crops, $3,795,079. Since 1920, it is estimated that the annual value has been increased by at least $15,000,000.

Government statistics show that the Sacramento carries the richest river cargoes in the United States, the average value per ton being $88.75. On the other main commercial streams, the ton values are as follows: Mississippi River, $78.15; San Joaquin, $77.60; Hudson, $75.80; Ohio, $31.90; Potomac, $17. It is also higher than the ton values of the cargoes received at the leading California ports, which

Scene on the Delta of the Sacramento River.

are: San Francisco, $86.65; Oakland, $71.35; Los Angeles, $40.75; San Diego, $33.80.

Volume of Shipping.

During the ten-year period, 1910-1920, there were 9,620,958 tons of freight, valued at $591,780,371, transported on the Sacramento River, while during the same period 1,632,868 passengers were carried. The percentage increase in tonnage during the census period, 187 per cent, led the nation, the nearest competitor being the San Joaquin River, with an increase of 72 per cent. During the past two years, the river's cargoes have averaged nearly a million tons annually.

At the present time, 265 vessels, with a combined tonnage of 18,810 tons, ply the Sacramento River. There are four main river shipping lines—the California Transportation Company, Southern Pacific Company, Sacramento Transportation Company, and Sacramento Navigation Company. The first two lines operate palatial steamers to San Francisco from Sacramento. Two of the largest and finest river steamers in the world are now being built for the California Transportation Co.

The terminus of the above immense volume of shipping is the Port of San Francisco. During the height of the season, its docks are crowded with the products of the Sacramento Valley.

Wharves and Warehouses.

The City of Sacramento has excellent wharfage and warehouse facilities. There are now 4734 linear feet of wharves, of which 1850 are municipally owned, and 201,000 square feet of warehouse space, of which the city owns 74,000. The city is completing the building of new wharves and modern warehouses at a cost of $250,000, equipped with the latest hoisting and river traffic loading and unloading devices. Several privately owned warehouses are also being built, and the Southern Pacific Company recently completed the rebuilding of its extensive docks and warehouses, burned in 1924.

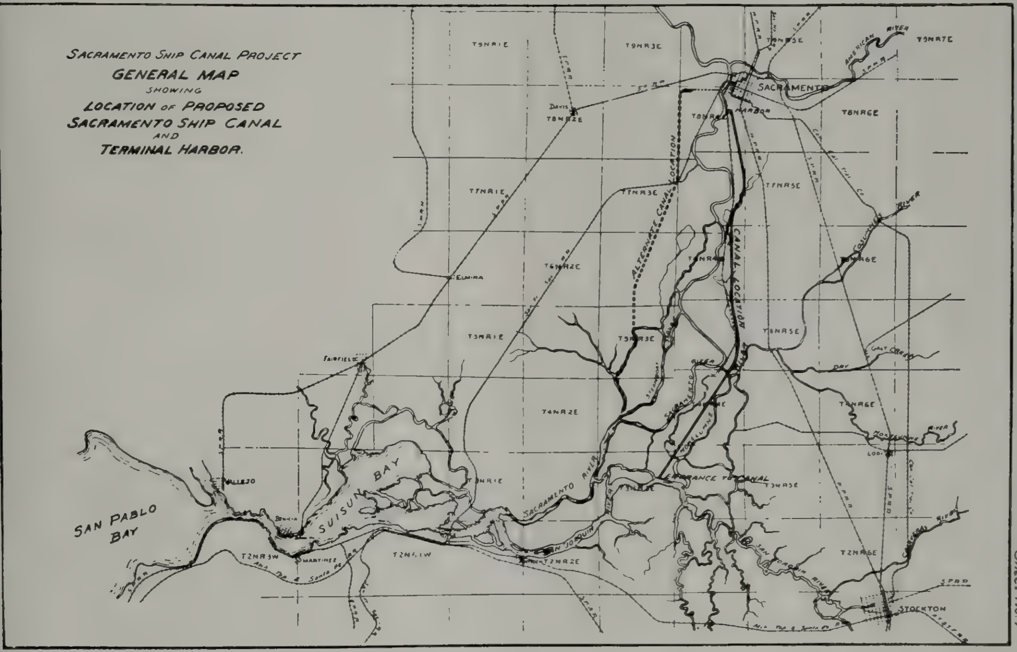
A belt railroad serves the wharves and the industries facing them. Across the river on the Yolo County side are other docks and large warehouses. Numerous wharves, landings, warehouses, and canneries are located along the river bank between Sacramento and the mouth of the stream.

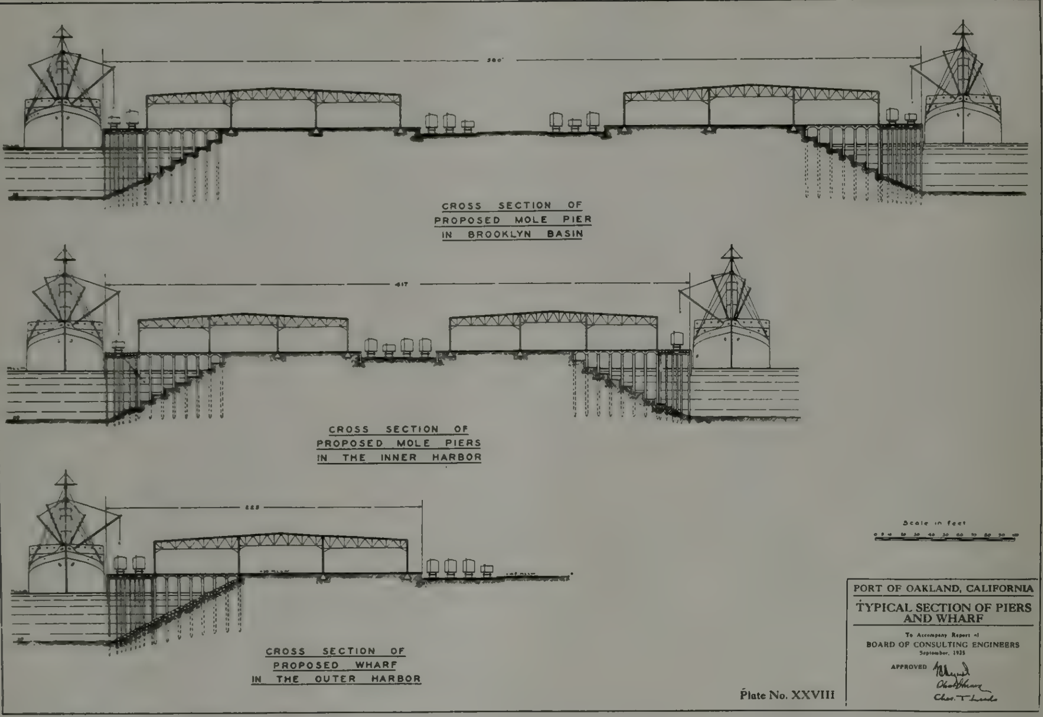
Although not generally known, commercial fisheries add considerably to the importance of the Sacramento River. The annual value of the fish caught in the stream, principally salmon and striped bass, is estimated at $2,500,000, and nearly the entire catch is transported by the river to the San Francisco markets.

Plan Deep Water Canal.

It is generally believed that the anticipated rapid growth of the cotton industry will expedite the construction of a deep water canal from Sacramento to Suisun Bay. Engineering surveys have been made and an economic survey by C. E. Grunsky, San Francisco engineer, demonstrated the need and commercial feasibility of the canal project.

It is planned to construct a 30-mile waterway, 30 feet deep and 150 feet wide at the bottom, east of the present stream, to avoid the tortuous course of the river. The cost of the canal, if the terminal harbor is located about six miles south of Sacramento, is estimated at $15,957,490. If the terminal port is built at Sacramento, the cost would be about $5,000,000 more, owing to the expensive ground to be bought for the port construction, much of it now improved business and industrial property.




380'
CROSS SECTION OF PROPOSED MOLE PIER IN BROOKLYN BASIN
417
CROSS SECTION OF PROPOSED MOLE PIERS IN THE INNER HARBOR
223
CROSS SECTION OF PROPOSED WHARF IN THE OUTER HARBOR
Scale in feet
0 5 10 20 30 40 50 60 70 80 90 100

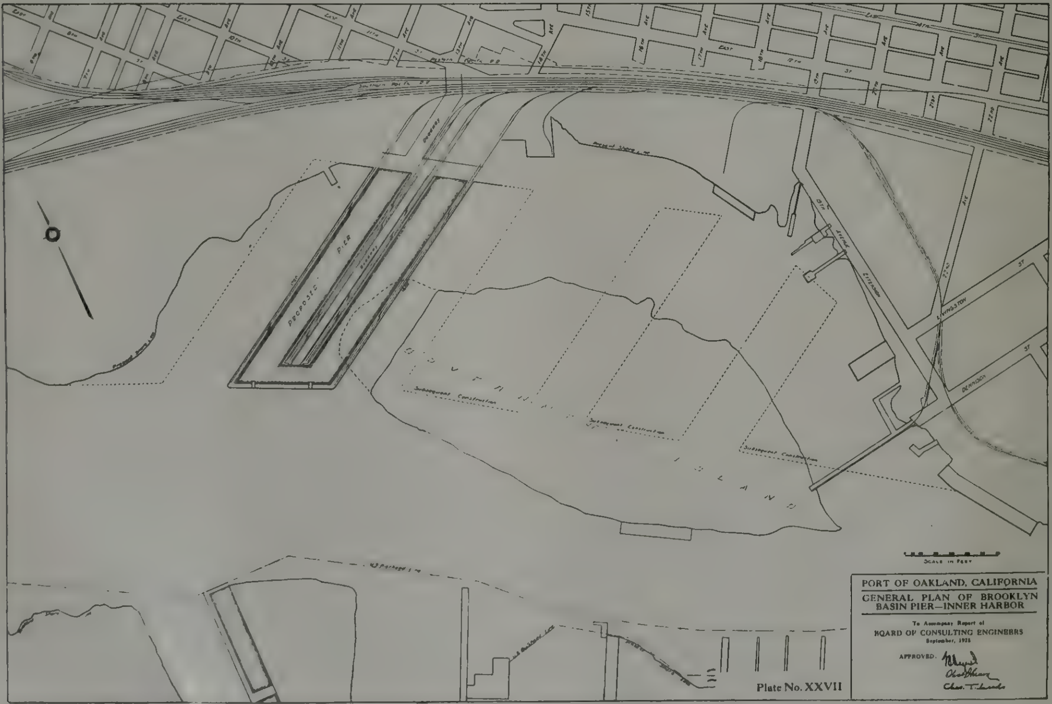
PORT OF OAKLAND, CALIFORNIA

TYPICAL SECTION OF PIERS AND WHARF

To Accompany Report of
BOARD OF CONSULTING ENGINEERS
September, 1925

APPROVED
Chas. T. Leeds

Plate No. XXVIII



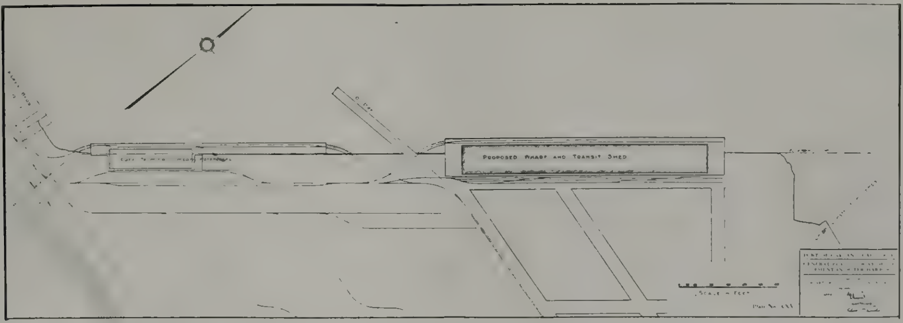
PORT OF OAKLAND, CALIFORNIA

GENERAL PLAN OF BROOKLYN BASIN PIER—INNER HARBOR

To Accompany Report of
BOARD OF CONSULTING ENGINEERS
September, 1925

APPROVED.
Chas. T. Leeds

Plate No. XXVII



Oakland's Proposed Port

A Ten Million Dollar Program for the Improvement of Oakland's Municipal Piers and Port Facilities in the Outer and Inner Harbor

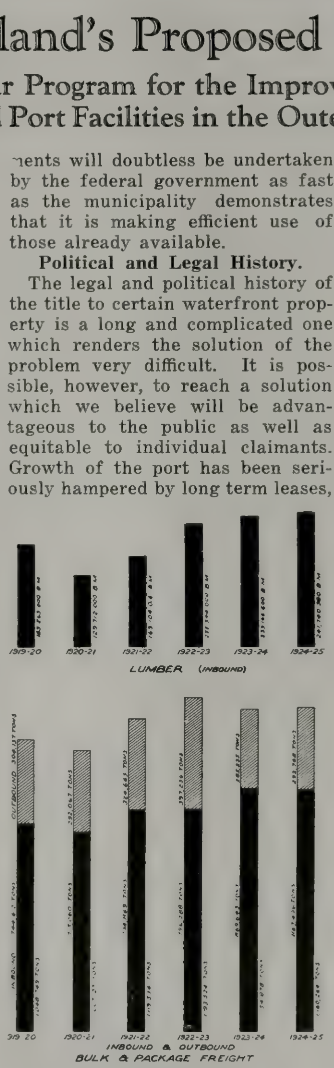
ALTHOUGH the entire waterfront of the City of Oakland was sold seventy-five years ago to pay for the construction of a two-room frame school house, it nevertheless was at that time and is today one of the most valuable assets in the State of California. With such a start we are not surprised to read in the report of the engineers, secured by the City of Oakland, to make comprehenive study of her port problem, that there are many changes, revisions, and additions necessary. The city recently passed a bond issue of approximately ten million dollars to carry out the recommendations of this report, the salient features of which are as follows:

The port development of Oakland thus far has been haphazard and has not kept pace with the rapid industrial growth of the city. The present system of United States harbor lines, while having served effectively the growth of the port up to the present time, should now be revised to better suit modern needs, making more efficient use of the land and water areas. A revision of the United States pierhead line between Market and Washington Streets has already been recommended to the federal government, thus permitting the construction of piers adequate to berth 500-foot ships. Additional changes will be recommended in final report.

The sum of $5,540,000 has already been expended by the Federal Government in improving the waterways of this port, which sum has been supplemented by large expenditures by municipality and private interests. Further improvements will doubtless be undertaken by the federal government as fast as the municipality demonstrates that it is making efficient use of those already available.

Political and Legal History.

The legal and political history of the title to certain waterfront property is a long and complicated one which renders the solution of the problem very difficult. It is possible, however, to reach a solution which we believe will be advantageous to the public as well as equitable to individual claimants. Growth of the port has been seriously hampered by long term leases, many of which are receiving little or no development, and from some of which the city is receiving grossly inadequate returns. Repetition of these mistakes should be guarded against and wherever possible measures should be taken to secure the improvement and utilization of existing leases in conformity with an adopted comprehensive plan and policy, or else have them relinquished.



Graph showing the freight tonnage movement in the port of Oakland from 1919 to 1925.

Nature has endowed Oakland with the first three requirements of a successful seaport.

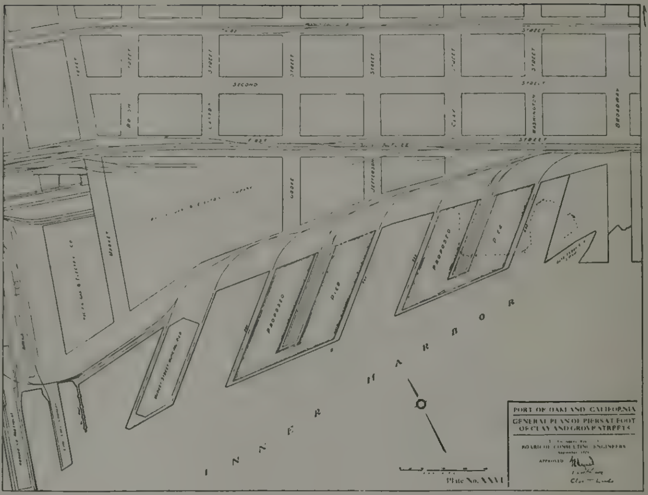
It is strategically located to handle world commerce, San Francisco Bay being the central port location of the Pacific Coast and Oakland being especially favorably situated on the eastern shore thereof.

It has a large and potentially productive hinterland in the immediately adjacent San Joaquin and Sacramento Valleys, and less directly in all of that country lying to the north, east and south, which is economically tributary to this port on account of existing rate structures.

It has an unexcelled navigable approach from the ocean, especially good anchorage facilities in San Francisco Bay, and excellent inland waterways in the San Joaquin and Sacramento Rivers, serving those great, fertile valleys.

Requirements.

With reference to the artificial or man-made requirements for a successful seaport, Oakland is already served by an excellent rail and highway system of land transportation, which will, however, require amplification and co-ordination. The interchange facilities be-


SECOND
FIRST
STREET
CLAY
GROVE
JEFFERSON
WASHINGTON
BROADWAY
PORT OF OAKLAND CALIFORNIA
GENERAL PLAN OF PIERS AT FOOT OF CLAY AND GROVE STREETS
BOARD OF CONSULTING ENGINEERS
APPROVED
Plate No. XXVI

tween land and water are at present extremely inadequate both in number and efficiency. The present port control and administration should be revised in accordance with the recommendations hereinafter made.

Size of Port.

Careful study of economic and other conditions indicates that a great future commercial growth must be anticipated for San Francisco Bay. Along the western waterfront of Oakland and in the inner harbor, however, there is ample space to develop all the port facilities likely to be necessary to handle Oakland's share of this growing traffic. In San Leandro Bay there is opportunity to develop on a large scale a well planned and efficient industrial harbor, directly served by rail transportation on one side and water transportation on the other. The necessity for such development, however, is not immediate.

In visioning the future, the port should be so planned as to accommodate on the western water-front the deep draft vessels requiring 35 feet depth or more. The inner harbor should be designed to care for vessels requiring a depth of 30 to 35 feet, while those of lesser draft will naturally be accommodated east of Brooklyn Basin and in San Leandro Bay. Ultimately further enlargement of these channels may be found necessary.

Channels, Basins, and Slips.

Recommendations for channel deepening adequate to accommodate the pressing present needs have already been made to the federal government. These requests should be followed up to obtain appropriation for the same. Construction of adequate facilities by the city along these improved channels will result in increased traffic, which will in turn justify demand for further improvement of these channels by the government.

To carry out any adequate improvement in Brooklyn Basin it is imperative, in the opinion of the Board, that, regardless of ownership, Government Island be removed. Such removal is in the interest of both Oakland and Alameda. The development of Government Island by Alameda is, in our opinion, neither feasible nor practicable. The latter city, by this removal, would be given a channel at least one thousand feet wide, for which it is now agitating. The provision of such a channel would furnish easy access to slips and piers, which would permit the most intensive development of approximately 3000 feet of Alameda's most valuable waterfront. Such angular pier and ship development would more than double the berthing space which could be provided by quay wall construction along the present harbor line, the only possible waterfront development with the existing narrow channel. The City of Oakland would be enabled to make the best possible improvement of its waterfront in the same territory.

Mechanical Freight Handling.

The efficiency of transfer of cargo between land and water carriers can be greatly increased by improved design and by the use of a greater amount of mechanical freight handling devices. For the present, we believe the latter should be confined to such labor-saving devices as tractors, trailers, stackers, and other similar appliances.

Recommended Construction.

The following recommendations for immediate construction cover facilities now needed, sufficient to occupy the only frontage available to the city for such construction at the present time, together with certain facilities in the Brooklyn Basin, which in our opinion will be necessary by the time the leases in that vicinity can be readjusted or have expired, and by the time the question of the disposition of Government Island can be settled. These improvements, though apparently isolated, are actually not so, but will co-ordinate directly with the future port plan, being merely the first complete operating unit thereof.

I.—Outer Harbor.	
1700-foot wharf, with 1500-foot transit shed, and necessary tracks and roadways	$1,470,000
II.—Inner Harbor.	
A double pier at Grove Street with 1700 feet of berthage and 168,000 square feet of transit shed, and a double pier at Clay Street with 1500 feet of berthage and 126,000 square feet of transit shed, with necessary roadways, trackage, and approaches	$2,664,600
III.—Brooklyn Basin Mole Pier.	
3800 feet berthage space, 600,000 square feet transit shed area, with necessary roadways, approaches and trackage	$3,820,000
IV.—Fire Boat and House	**$250,000**
V.—Warehouse and/or Cold Storage Plant	$500,000
VI.—Miscellaneous Dredging	$350,000
VII.—Contingencies, 10%	**$905,460**
Total	$9,960,060

Oakland is particularly fortunate in its opportunity for future industrial expansion, both in the comparatively undeveloped western waterfront and in the Brooklyn Basin and to the east thereof. The nearby developed or potential waterfront makes it possible to lay out an industrial harbor and industrial districts of maximum efficiency.

In this connection there is a splendid chance on both Brooklyn Basin and on the outer harbor front to demonstrate the value of scientifically arranged zones.

The Marine Superintendent

Checking Tanker Performance

CHARLES IRVIN, marine superintendent of the General Petroleum Corporation, is an engineer who firmly believes in system. His data on subjects pertaining to design, building, and operation of steam and motor vessels are almost encyclopedic. Such information is highly valuable and of great assistance when a question of costs for new work or repairs comes up. This methodic way of keeping records has been a feature with Mr. Irvin for years. When a lad at school in Ohio, his native state, he always kept close tabs on youthful tasks.

Charles Irvin, marine superintendent, General Petroleum Corporation.

Mr. Irvin came to California in 1892 and shortly thereafter took service with the Pacific Coast Steamship Company, remaining with them for six and a half years. During this time he worked up from junior to chief engineer. At the outbreak of the Spanish-American War, he joined the United States Transport Service as chief engineer, making several voyages to Manila. After the trouble was settled Mr. Irvin joined the American-Hawaiian Steamship Company as assistant engineer and was with them for eleven years, having attained the position of assistant superintending engineer. From them he took service with the United States Shipping Board and when the activities of that organization lessened he joined the General Petroleum Corporation as port engineer in October, 1919. Shortly after he was made marine superintendent, with headquarters in the Higgins Building, Los Angeles, in which city he has resided for the past five years.

During his tenure with the General Petroleum Corporation Mr. Irvin looked after the construction of the tankers Liebre and Yorba Linda, the first built by Bethlehem's Alemeda plant and the latter by the Union Construction Company of Oakland. He also was sent to Holland to pass on the specifications of the two large tankers built for the Corporation in Amsterdam. These vessels are 13,240 tons register, driven by 4000 horsepower Werkspoor diesels. Every phase of their operation costs and performances has been carefully compiled by Mr. Irvin, and he can at a moment's notice answer any inquiries regarding these, together with similar data covering auxiliary equipment.

In fact all data of the tankers, of which the Corporation operates nine, are completely kept for reference. This, of course, is of great assistance to inspectors and insurance companies. Representatives of these, speaking to a Pacific Marine Review representative, were most decided in commendation. But in spite of the completeness of the work, and time required to attend to the many matters pertaining to his position, Mr. Irvin always finds a moment to speak with courtesy and kindness to those who are at all hours interviewing him, some seeking his aid to obtain employment, others to interest him in something mechanical, and again, others to discuss matters pertaining to repairs or construction.

Among the latest of Mr. Irvin's activities are the two jobs just completed on San Francisco Bay, one, the tanker Lio, converted from steam geared turbine to diesel engine of the Bethlehem 2-cycle solid injection type, and the diesel-electric barge General.

Routing Coastwise Freighters

THINGS maritime always interested Anton J. Houda, freight traffic manager of the Nelson Steamship Company, San Francisco. Born in Korbell, Humboldt County, California, he early had a hobby for the sea. His playtime was mostly on Arcata wharves, learning about ships of the coast; learning them, as boys will, from the practical angle and getting first-hand knowledge of lumber cargoes going out and general cargoes coming in. However, his parents wished him to take up banking as a business, and after graduating from the high school of Eureka, he attended for two years the University of California, then entering the Bank of Folsom, going from there to the Sacramento Valley Bank. He was with these institutions for some five years, but the lure of the sea was in his make-up. He was never in love with the banking end of business, but through it obtained a sound practical knowledge of finance and handling of affairs.

In 1914 he came back to the sea as purser of the old steamer North Fork, one of the Nelson Company's

(Continued on Page 85)

Anton J. Houda, freight traffic manager, Nelson Steamship Company.

General Engineering Expansion

A Practical Demonstration of Confidence in the Future of the Shipbuilding and Ship Repair Business of San Francisco Bay

THE General Engineering and Drydock Company, San Francisco and Alameda, has at its head men with an abiding confidence in the future of maritime business. They have shown this confidence in a very decided way. Starting on a small scale a few years ago, they adopted the motto "Good work at fair prices." The result has been very satisfactory. Though, like many similar organizations they have had lean times, never for a minute did President George A. Armes and his associates lose their optimism. Naturally a steady expansion of business has followed this policy.

At first the repair shops in San Francisco were located in very cramped quarters on Battery Street. As progress was made, the need of more room was seen. To obtain this, the property on the corner of Sansome and Green Streets, 98 by 120 feet, was purchased. The building on this lot was remodeled to made it handier for the work to be done, and many of the machines and tools from the old shop, as well as several new ones, were installed. All the old machines were thoroughly overhauled and made equal to new.

A very noticeable adjunct to the shop equipment is a 10-ton crane electrically operated, which was designed and built by the staff of the company. Owing to somewhat limited head room in the main shops, it was found that standard cranes could not be used. This crane is a mighty fine job. It has a 56-foot span with 100-foot travel, is very flexible and easily handled, and is in every way a credit to its designers and to the mechanics by whom it was built. All the lathes, boring mills, drills, etc. are electrically driven. In fact there is not a countershaft or a belt in the shop.

The main floor is very light and airy, which will make for greater efficiency and accuracy in the work. The locations of the several machines have been so arranged that a minimum of handling of material is necessary. This means cheaper cost of performing the work.

Among the tools are some of extra heavy type. One of them, a 72-inch boring mill, built by the Cincinnati Tool Company, is of the latest and best design. A 48-inch American radial drill and a 72-inch Niles-Bement-Pond radial drill

THE NEW SHOP.
Above is shown an exterior view of the new marine machine shop and offices of the General Engineering & Drydock Company of San Francisco and Alameda, and also the machine shop gang grouped in front of the main entrance. Below, the illustration shows an interior view of the offices of the company.

stand out as able to take care of all heavy work. Smaller units of standard makes are at hand. There is full and complete equipment of small tools, air and electric driven, used in repairs aboard ship. Compressed air is supplied by two Westinghouse steam-driven machines mounted on portable trucks, the frames and carrying gear being designed and built by the General Engineering Company. These are flexible and can be taken on board ship either from barges or from the pier. Each of these compressors will supply air to twenty hand tools.

A well laid out pipe shop is fully fitted with Oster pipe gear and tools, in capacities up to 6-inch sizes. A sturdy Racine power hack saw installed in this shop will take 10-inch diameter pipe, and the shop is very handily arranged for rapid turning out of jobs.

A new horizontal boring mill of 60-inch travel, built by Niles-Bement-Pond Co., is heavy enough to take the largest jobs and, together with a powerful wheel press, insures prompt dispatch of heavy work in the machine shop. Punches, shears, and trimmers, large and small, are supplied in sufficient numbers so that the shop can give very quick action on emergency repairs to ships. A complete equipment for electric and oxy-acetylene welding is another insurance of dispatch. In fact nothing that experience can suggest has been omitted in the shop equipment.

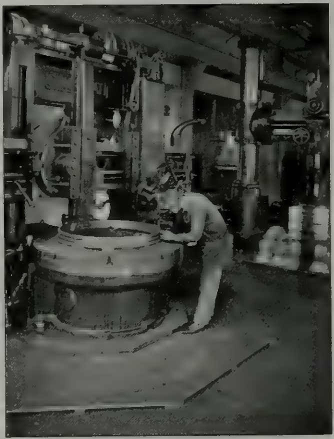
The personnel of the General Engineering & Drydock Company is made up of trained men. George A. Armes, president, and F. H. Fox, superintendent, are both well known marine engineers, knowing engine building and repairs and operation in all details. J. F. Mooney, vice-president, and James H. Young, secretary-treasurer, are hull men of ripe experience. The former was associated with the Skinner & Eddy interests during the war-time rush of work at that plant at Seattle and knows how to turn out good and quickly finished jobs. The latter is a naval architect and is familiar with all the intricacies of the business. Besides these gentlemen, a force of skilled artisans is kept on the rolls, ready at all times to do their bit in keeping the merchant marine fleet on the job.

Several views of the new shop in San Francisco appear in this issue of Pacific Marine Review and show how well the lay-out has been arranged. Besides the attention paid to machinery, the welfare of the working force has been considered. Commodious locker rooms with shower baths have been provided. The general offices are all exceptionally well lighted and ventilated, with everything arranged for maximum efficiency with minimum of time expense. As a whole the new San Francisco shops and offices are models of their type. And to again show the optimism of the management, it is in order to say that an expenditure of a quarter of a million dollars has been made in this addition and improvement to the plant. But, as one of the firm remarked, it requires an expenditure of cash to bring the returns.

Every detail of quick repairs has been thought out and applied in this latest addition to the marine machine shops of the Pacific Coast, and the organization is ready to take hold of any sort of work and believe they can handle it is well as any other establishment. The shipyard and drydocks at Alameda can haul out vessels of all tonnages and build almost any size of a hull, and the machine and plate shops there are fitted with heavy tools, so that new and repair work can be done in a hurry if needed.

Shop Interiors

Above is shown an interior view of the pipe shop, featuring pipe threading machinery and one of the portable steam compressor units that have proved a very useful adjunct to repair work, as they can be taken on board ship and used to supply air to hand tools, using the ship's steam for motive power. Below is shown a close-up of the large boring mill, with large radial drill in the background. At the bottom of the page is a view showing one end of the machine shop bay featuring the 10-ton crane of 56-foot span which was designed and built by the General Engineering Company for their own use.



Marine Oil Engine and Motorship Progress

Fairbanks-Morse Marine Diesel

The Well-known CO Engine is now Developed into an Airless Injection Diesel with no Sacrifice of its Rugged Simplicity

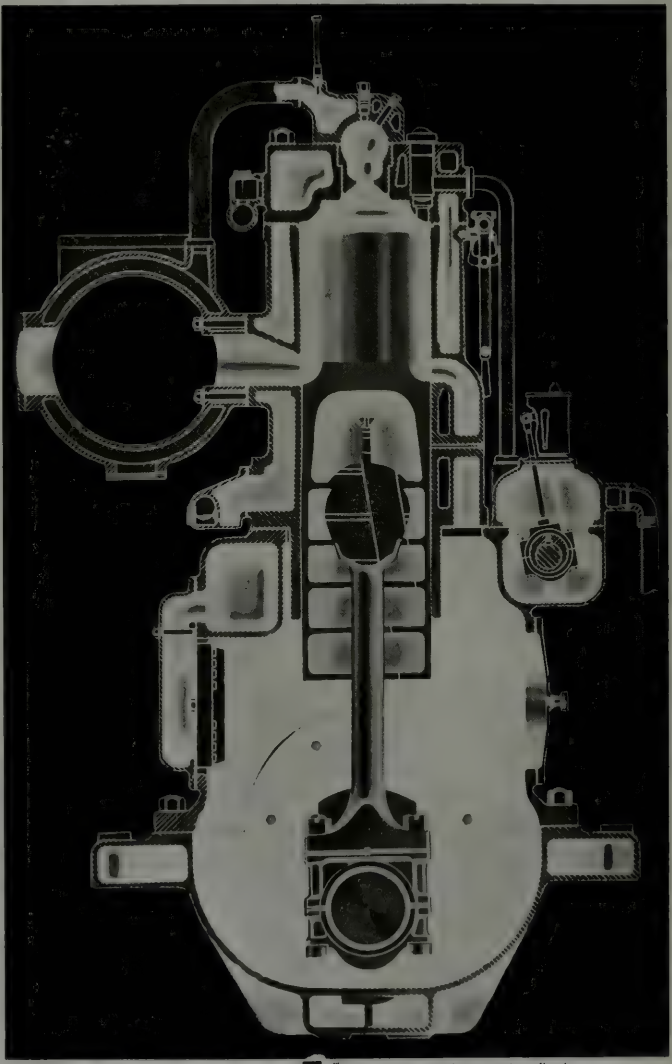
ONE of the results of the huge development program in the design and building of diesel engines for both the marine and stationary fields which has been in progress at the Beloit works of Fairbanks, Morse & Company, has been the redesign of the type CO engine. The marine diesel is not, however, a radical departure from the well known type CO engine of which 150,000 horsepower are in successful operation. The principal improvements are those which adapt the engine to use a still wider range of low grade fuels, to secure better fuel economy, and to provide the means for immediate starting without the aid of auxiliary ignition devices.

One of the points which strikes the observer in the new model is the unusual compactness and extreme simplicity of the engine. While this is fundamentally due to the 2-cycle principle and the use of airless injection, this simplicity is also the result of very careful design. All piping has been eliminated or enclosed, and the starting, reversing, and governing mechanism has been worked out in a simple unit located at the center of the engine. The goal of the designers was to produce an engine of maximum simplicity and reliability and that object has been achieved by thoroughness in the execution of the details.

An interesting feature is the use of a two-stage combustion. This combustion arrangement was developed at the Beloit works after extensive experimental research had demonstrated its many advantages.

A few degrees before the compression has been completed near the top dead center of the piston travel a spray of fuel is introduced into the combustion chamber through a nozzle centrally located at the top. Partial combustion which results in burning the fuel charge to the gas carbon monoxide (CO) with the liberation of relatively small amounts of heat takes place in the chamber as the first stage of the process, so that no liquid fuel remains at the end of the first stage. Because of the partial nature of the first stage of combustion there is no pressure rise of any consequence.

As the piston starts on the downward stroke, with the attendant rush of gases through the neck into the cylinder space, a considerable degree of turbulance and a thorough mixing of the air excess



Transverse section through cylinder of the Fairbanks-Morse marine diesel with the CO gas and oil vapor is brought about, and in the final combustion the change of the entire charge into carbon dioxide (CO_2) gas is completed.

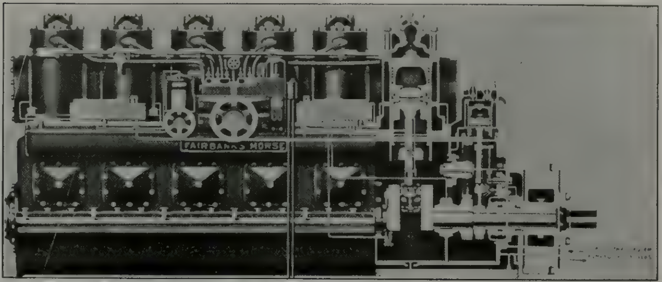
Over fifty per cent of the heat due to the entire combustion is liberated in the second stage; but owing to the fact that the piston is now beginning to pick up considerable speed the expansion quite accurately neutralizes any rise in pressure which might result from the more intensive and complete second stage combustion. So thoroughly has the system been worked out that flat top indicator cards are the result, and the engine works with spontaneous ignition of fuel and complete burning unaccompanied by pressure rise according to the method first conceived by Dr. Diesel.

One of the most important advantages of the two-stage combustion scheme is that its success is not dependent on the use of fuel injection nozzles with fine multiple orifices or the use of high injection pressures.

One of the particularly interesting features is the approximate equalization between the velocities of the oil jet and of the air velocity entering through the neck toward the end of compression. It was established that an insufficient velocity did not have the best results, because of deficient turbulence, and that an excess of velocity had a tendency to throw the fuel back against the cooler portions of the combustion chamber. Careful design and precision in manufacturing methods have made it possible to secure the proper balance between air and jet velocities.

A careful distinction is to be made between the system here used and those pre-combustion methods which depend upon an actual explosion for projecting a part of the still liquid fuel charge into the cylinder and in which apparently insignificant changes in the volatile content of the fuel are sufficient to upset the combustion conditions in a way that may be of serious consequence to the engine. From the practical operator's point of view the use of a low velocity fuel oil jet has some important implications. Not only are excessive fuel pump pressures avoided but it is possible to employ unusually large atomizers and injection nozzle diameters.

Actually the nozzle diameter is 5/64 inch, and the helical stem placed just ahead of the nozzle has coarse grooves of nearly the same size. A spring-loaded check valve placed inside the body of the nozzle makes for a sharp beginning of the jet. In view of the large passages through it there would hardly seem to be any occasion for ever taking it out; nevertheless, it is accessibly mounted and can be removed in less than a minute by simply unscrewing it.



The 6-cylinder Fairbanks-Morse marine diesel with partial longitudinal section through air compressor and one cylinder.

Control.

Complete control of the engine is centered in a compact and accessible unit located at the center of the engine. The fuel injection pumps and air starting and reversing mechanism are housed in this unit. A governor unit, with its handwheel for speed control, is mounted alongside the injection and air starting unit; thus centralizing the complete control system. When the control handwheel for starting the engine is rotated, the main air valve is opened by a cam on the control shaft. The compressed air passes through this master valve to a passageway which supplies air to the individual valves for each cylinder. The air starting cams revolve with the cam shaft raising these individual valves and admitting air to each cylinder in the firing order.

During the admission of compressed air the fuel control cam turns an arm located underneath it, which in turn rotates a shaft raising the suction valve rockers so that the fuel cannot be injected. When the engine begins to turn over on compressed air the control wheel is turned back to the running position and the fuel control cam releases the suction valve rockers, the fuel pumps then begin to inject fuel to the cylinders, and firing commences.

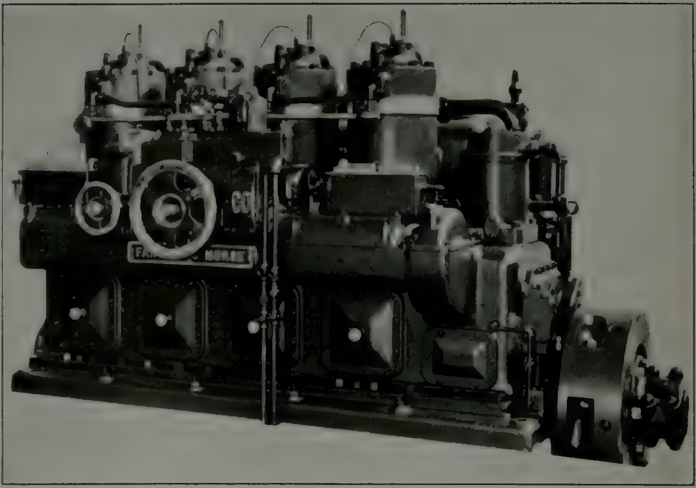
When the control wheel is turned from the start to the run position the main air valve is closed and a relief valve is opened, allowing the air under pressure in the space leading to the master valve to escape to the atmosphere.

It will be noted that the cam shaft also carries the cams which operate the fuel injection pumps. As the cam revolves it raises the injection pump roller which in turn actuates the injection pump plunger. It is not possible, however, for fuel to be injected through the discharge valve to the cylinder until the suction valve has closed. The closing of this suction valve is accomplished by means of a valve rocker which is actuated by the upward movement of the injection pump plunger. This suction valve rocker is pivoted on a shaft which is turned through a slight angle as the pump plunger moves upward. As the rocker drops the suction valve closes and the fuel oil is trapped so that its only course is through the discharge valve and to the cylinder.

When reversing the direction of rotation, a cam on the engine control shaft actuates a roller pinned to the reverse control arm. This arm in turn moves the air starter rockers and rollers along the shaft until the rollers are directly over the correct cam. When air is then admitted to the individual air start valves, these push the air start rockers with their respective rollers down on the cams and the position of the cams determine which starting valves remain open to start the engine in the desired direction.

Crank Shaft.

A crankshaft conforming to the highest diesel engine specifications is bedded in long journals, and works under lower specific bearing pressures than in the old engine, in spite of the fact that the compression in the newer type engine has been raised to 500 pounds per square inch.



The 4-cylinder Fairbanks-Morse marine diesel showing the control unit.

Connecting Rod.

A die-forged connecting rod—one of the largest of this kind manufactured—is fitted with a bronze babbitt lined cranking box in two halves and is permanently aligned to the latter by means of a longitudinal key.

The piston transmits its motion to the connecting rod through a hardened piston pin of large diameter. Here again the amount of bearing surface has been increased so that the pressure is not materially different from that found in the former design.

Lubrication.

For the supply of lubricating oil to the piston pin a movable side scraper, working in a counterbore of the pin, is used; and at assembly it is carefully bedded to the radius of the cylinder against which it is urged in operation by means of a light spring. V-shaped recess cut into the cylindrical contour of the scraper and terminating in a throat at the base of the V surface is an effective lubricating oil collector. Leading from the counterbore in the end of the piston pin is a steel pipe with a drop nozzle securely brazed into place, a provision which has eliminated the possibility of its loosening or breaking off in service.

One of the more interesting features of the piston pin lubricating arrangement is the dependence on a large number of holes through the walls of the hallow pin for the proper distribution of the oil over the bearing surface. The pin of course is pack hardened and ground, but before the hardening process is carried out the lubricating holes have been countersunk with radii which obviate all sharp edges and provide for the positive formation of the lubricating oil film.

In order to still further simplify the operation of the engine and to assure the maximum reliability of service, the lubricating system has been made completely automatic. That this has been thoroughly worker out is shown by the fact that there is not a single place in the engine that requires manual lubrication, as there are no oil holes or grease cups to be found.

At the after end of the base is a clean oil reservoir, in which the suction of the distributing oil pump is set. A similar pump is placed at the other side; and its suction is set in the sump at the bottom of the base. Both pumps are identical and are driven by means of arms and links. Oil is forced to the center piston pin, crank pin, and main bearings by force feed lubricators. From these bearings a surplus finds its way to the lower crank case, from which it is drained to the sump. The dirty oil is then pumped to the oil filter and after being cleaned is fed to the sump chamber for clean oil, from which it is pumped into the lubricator and cam shaft oil pipe header.

The cam shaft bearings, cams and eccentrics are lubricated by means of the cam shaft oil pipe header to which oil tubes and oil spitters are connected. Clean oil is pumped directly to the oil pipe header by means of the clean oil pump. This same pump also supplies clean oil to the lubricators for distribution. The excess oil pump to the lubricators overflows into tht sump chamber.

In order to warm the oil so that it will filter freely in cold weather the filter is provided with a water-jacket which can be piped up to the hot water discharge from the circulating system. The filter is equipped with a four section screen which removes any impurities which have accumulated during the passage of the oil through the engine.

Air Compressor.

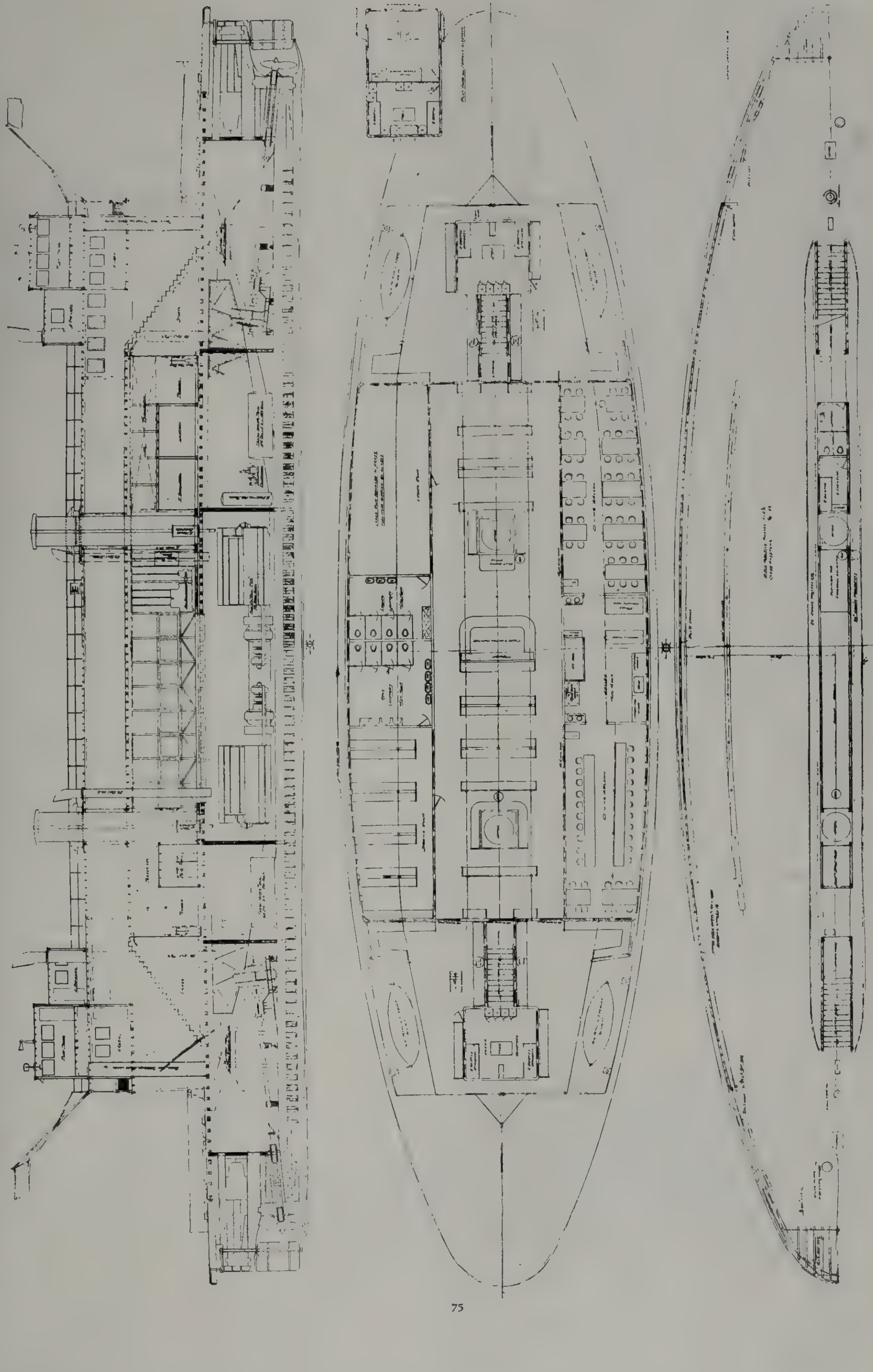
At the after end of the engine an eccentric drive is provided for the air compressor and the circulating pump. The air compressor is of ample size to meet the usual conditions. It is single acting with a trunk piston. Spring loaded poppet valves are used at the air inlets while the discharge valves are of the cup type, spring loaded. An unloading device is located in the cylinder head which is operated by pulling a knob which opens the suction valve.

Cylinder Cooling.

One of the features of the engine is the simplification of the cooling water connections by the use of cast iron headers. There are two of these headers, one at the bottom of the cylinder water-jackets and one which is connected to the cylinder heads. In temperate climate the lower header valves may be throttled down so that the main circulation takes place in the cylinder head, but in warm climate the lower header valves are partially opened.

A large two way ball thrust bearing is located on the after end of the crank shaft. This bearing is lubricated under pressure and an oil throw ring and drain keeps any lubricating oil from creeping along the shaft.

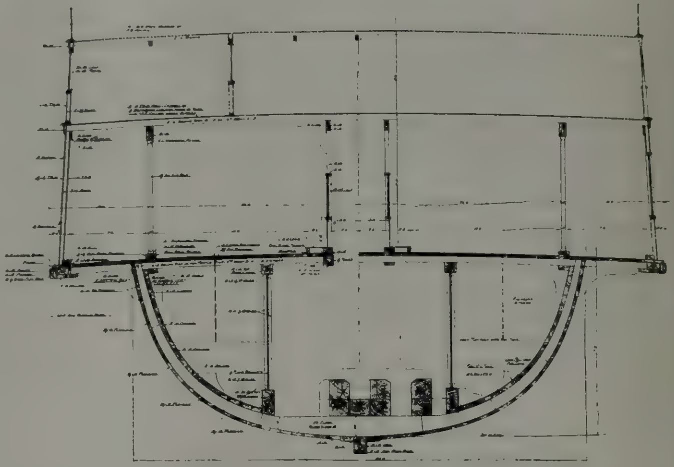
The cam shaft is driven by a train of three solid-forged steel spur gears. The drive gear is keyed to the after end of the crank shaft and transmits power to the cam shaft gear by means of an idler gear, which runs on a hardened and ground steel shaft supported by a cast iron jacket, which in turn is bolted and doweled rigidly to the upper base. Each meshing point of the gear train is lubricated by an oil spray.



Inboard profile and deck plans of the new diesel-electric ferry Golden State, now building at the Alameda plant of the General Engineering and Drydock Company for the Golden Gate Ferry Company.

New Diesel-Electric Ferryboat

Golden Gate Ferry Company, Pioneers in the Use of Diesel-Electric Propulsion, Building Three New Ferries for San Francisco Bay Use.



Amidship section of the ferryboat Golden State.

THE motor ferryboat now being built for Golden Gate Ferry Company at the yards of the General Engineering & Dry Dock Company, Alameda, California, is to be in many particulars a departure from the usual type of diesel driven ferryboats.

There is now being built at the plant of the Pacific Diesel Engine Company, Oakland, California, a set of Werkspoor engines for installation in this new boat, being in three units of 400 horsepower each. The Golden Gate Ferry management decided to build engines of this type rather than a two-unit engine as in the ferryboats Golden Gate and Golden West for two reasons; first, to reduce vibration; second, to permit operation of the boat even though one engine be disabled. This is a distinct economic saving to the company.

The motors, which were built by the General Electric Company, are more powerful than those in the Golden Gate and Golden West, being of 950 shaft horsepower each.

In the passenger deck plan there are many innovations and new departures. The lifeboats will be slung on the Texas deck, and both ends of the passenger deck will be enclosed in glass, so that passengers may have the full freedom of the boat, with a splendid view, and yet be protected from the elements. The windows fore and aft are adjustable, so that they can be lowered and raised at pleasure. The deck plan, reproduced herewith, does not fully illustrate this innovation, but gives, however, rather clearly the entire construction other than that, and shows the general arrangement of generating sets and motors.

This boat is designed to make a speed of 14 knots and to carry 84 automobiles. It will have pilot house control, and Golden Gate Ferry Company is doing everything possible to make it the very latest in scientific boat construction.

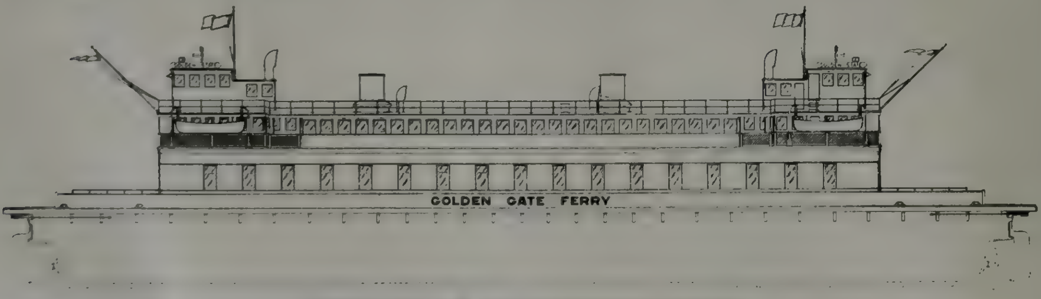
Pilot house and engine room control apparatus, switch boards, and auxiliary motors are being furnished by the General Electric Company. The control of propulsion motors will be on the Ward-Leonard field control system, and will follow the general lines of the installation of that system which has functioned so successfully on the ferries Golden Gate and Golden West.

The contract with the General Engineering & Dry Dock Company provides that this boat be in service by May 15, 1926.

Practical Seamanship

The University of California, Extension Division, announces class courses in shipping to be held in San Francisco. The one on Practical Seamanship was started on Monday, January 18, at 8 p.m., in room 234 Pacific Building, 821 Market Street, San Francisco. Captain Edward McCauley, Jr. is the instructor.

Ten lectures will cover the art and evolution of practical seamanship from the early sailing ship to the modern steam or motorship; the equipment, manning, and handling of vessels on the high seas and within restricted waters, etc.



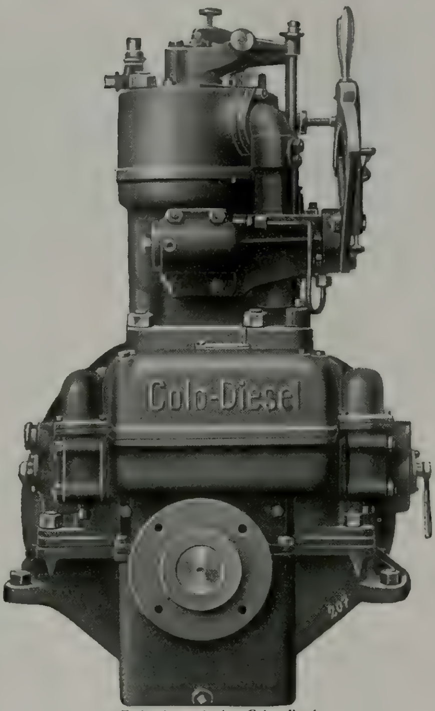
Outboard profile of the new diesel-electric ferryboat Golden State.

Pacific Workboats and Their Power Plants

New Light Weight Diesel for Small Boats

AVAILABLE on the Pacific Coast are now the products of the Colo Diesel Motoren Gesellschaft of Munich, Bavaria. This concern is the combination of three large manufacturers which after the war took over one of the biggest German aircraft engine plants for the purpose of turning out (for the first time on a large production basis) a standardized full diesel engine of small power and light weight.

In developing such an engine the company had at its disposal the extensive experience of Germany during the war period with fast running submarine engines and further the full benefit of one of the most modern and fully equipped plants and laboratories for the manufacture of engines of this size. Had it not been for the existence of this plant, lying idle after the close of the war, this engine might as yet not have been developed. As it was, however, with the equipment and capital at hand this was the only peace-time product which was suitable for manufacture and would justify mass production on account of an ever-increasing demand for an economical and reliable power plant of small output at a reasonable price.



End view of the Colo diesel.

The Colo Diesel Motor is of typical marine design. Operating on the approved 4-cycle principle, it has a more economical fuel and lubricating oil consumption and can be better regulated than 2-cycle engines.

The piston draws into the cylinder fresh air only and compresses it to 420 pounds, thereby assuring self ignition after the injection at the end of each compression stroke of the proper quantity of vaporized fuel into the highly compressed air through the spray nozzle. The measurement in the fuel pump of the exact amount of fuel oil for each combustion stroke is regulated by the governor. Each cylinder has a separate fuel pump driven by the camshaft. The governing of the combustion process guarantees slow as well as a complete combustion and a long sustained expansion without a material increase of pressure, thus assuring an elastic and smooth running of the engine, which is shown clearly by the very good constant pressure diagram of the Colo diesel. The Colo diesel of course has mechanical fuel injection, and as the starting is effected by hand it requires neither compressor nor electrical equipment.

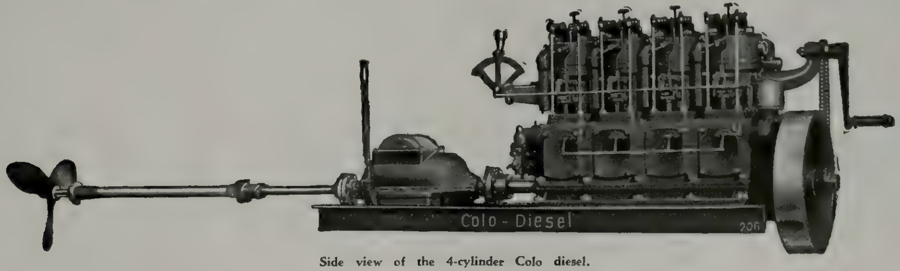
This engine has built-in circulating and bilge pumps, forced lubrication with an efficient filter, an automatic governor, water-cooled exhaust manifold, thermometers for cooling water, and is furnished either with reverse gear and clutch or with reversible bladed propeller.

The question of excessive weight has been perhaps the most outstanding objection against the majority of the available oil engines for small craft.

The Colo diesels of 5-inch bore by 7-inch stroke, developing 8 horsepower per cylinder at a normal speed of 750 revolutions per minute, weigh less than any other similar engine on the market.

Weights of complete marine installations, including engine, flywheel, foundation frame, fuel tank, silencer, reverse gear, shafting, and propeller are as follows:—

1 cyl. 8 HP. installation 1250 lbs.
2 cyl. 16 H.P. installation 1670 lbs.
3 cyl. 24 H.P. installation 2045 lbs.
4 cyl. 32 H.P. installation 2580 lbs.



Side view of the 4-cylinder Colo diesel.

A Speedy Lake Tahoe Cruiser

While the workboat section of Pacific Marine Review is primarily devoted to the doings of the sturdy craft that tug and toil, it sometimes is interesting to mention slimmer and speedier craft. On the placid waters of Lake Tahoe, far from the swinging tides and currents of the Pacific, are many of the latter. One of the finest, perhaps, is the motorboat Sheik, owned by George A. Pope, who uses her for pleasure and fishing during the delightful summer seasaon. The Sheik, whose photo is shown here, was built by the Elco Works, New York, famed for this type of craft. Her engines are two 180 horsepower Speedways, and will send her through the water at a 26-knot clip. She is 60 feet in length by 10 feet 6 inches beam, and is fitted up most comfortably without extravagant display, being in the best of taste. Mr. Pope has always been a keen sportsman, and his knowledge of ships and things maritime makes him demand the best in this line. Hence the Sheik.

George A. Pope's motorboat Sheik, making 26 knots on Lake Tahoe.

This craft was shipped out from the eastern yards by rail. Herman Borner, her present captain, making the land voyage with her. A fine ways and boathouse are used in hauling out for winter and housing the Sheik and several other vessels of her type.

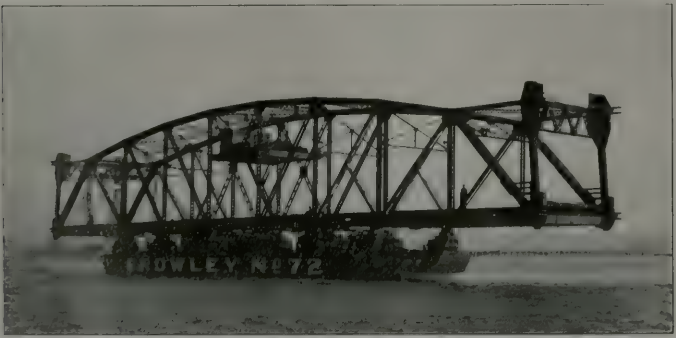
Mr. Pope is also the owner of one of the fastest displacement speed boats on the coast, the Baby Gar, She is 33 feet long by 7 foot beam and is equipped with a 500 horsepower Super Liberty motor. The boat has a speed record of 62 miles per hour. She is the duplicate of the boat which last year beat the New York Central train on a trip from Albany to the Columbia Yacht Club, New York City.

In Boatyard and Engine Shop

Motor yacht Goodwill Jr., owned by H. O. Howard, has been completely overhauled and repainted at the Madden & Lewis Company's yard at Sausalito, California. The Goodwill Jr. met with an accident some weeks ago, being badly burned on the port side. As her planking is of the diagonal type, it was quite a job to make the repair, but it has been done so well that not the least sign of the damage is noticeable. Her two Hall-Scott engines have also been attended to, and she can now reel off 21 miles per hour without much trouble. All interior fittings and furnishings are in fine condition, and the yacht is ready for service at the order of her owner.

* * * *

The Standard Fisheries Company's workboat Pulaski has been overhauled at the Madden & Lewis yard, Sausalito. Her old gas engine has been taken out and an Atlas-Imperial diesel installed. This is of 65 horsepower and though considerably more than the original power plant will cost much less for fuel.


A Crowley barge, propelled by a Crowley launch, carrying a Dumbarton Bridge span down San Francisco Bay.

* * * *

The San Francisco International Fish Company has placed an order with the Madden & Lewis Company of Sausalito for a heavily built trawler. The new boat will be 54 feet in length, 15 feet beam, with a draft of 5 feet. She will have an Atlas-Imperial diesel of 90 horsepower, which will give her a good speed and at the same time be just what is needed when a heavy trawl is to be hauled. The lines of the craft are exceptionally good showing a fine seaworthy shape, together with clean entrance and run which will insure ease of handling. The timbers and planking are extra heavy to provide for hard usage. Engine timbers are carried for over half the length of the vessel, and frames are solid under machinery.

* * * *

That many workboats are being or are to be built is evidenced by the number of small engines under construction for these craft. At this writing there are thirty-one sets going through the shops of the Hicks Engine Works, 967 Howard Street, San Francisco. These units are from 6 to 24 horsepower. Seven of them are of the new 3-cylinder type, of 15 horsepower. All are to be installed in Pacific Coast fishing boats and workboats, which require light and quick power, so far only attainable by gas engines. Owing to the demand for this type of motor the Hicks works have for the present laid over any orders for their diesel engine.

* * * *

The workboat Starlight, operated by Rhodes-Jamieson & Co., of Oakland, California, was fitted with the first diesel engine built by the Union Gas Engine Co. This was two years ago, and Starlight has been steadily at work for that time. Recently she was laid up for a general overhaul and clean up. It was found that very little was needed. There was no shake in her several bearings; cams showed hardly any wear; and, in fact, she was in fine condition. This shows careful operation, together with a substantial design and construction.

* * * *

Union diesel engines, built in Oakland, have proved so suitable in power plants in Arizona, that a repeat order for four 6-cylinder 300-horsepower units has just been placed with the Union Gas Engine Co. by an Arizona copper company. This will make a total of nine engines for the same firm. As these motors are working at an elevation of 6000 feet above sea level, the fact that they show high efficiency proves that the diesel can adapt itself to severe conditions and still deliver the goods.

* * * *

A curious craft skims the waters of Klamath River, Oregon. Its power is an automobile engine, which, by an arrangement of pulleys and shafting, together with a scaffolding carrying a two-blade airplane propeller, gives the odd-looking boat about twelve miles an hour speed.

The engine and hull were built by Arla Cates of Requa, California. He uses this peculiar workboat in the fishing business on the river. She is 9 feet beam and 28 feet long, straight at the sides and ends, but with the bottom curved much like a rocker at bow and stern.

Three well-known handlers of workboats on San Francisco's waterfront.

Willie on the Job.

Keeping tab on a fleet of workboats is quite a job in itself. Their comings and goings have to be carefully checked or there are bound to be idle hours, and a workboat, like her larger ocean-going sisters, only earns money when she is running. Tied up to the dock she is a liability.

William Figari holds down this job at the wharves of the Crowley Launch & Tugboat Co., San Francisco, and is at times as busy as the proverbial bird dog. Willie, as he is best known among his many friends along San Francisco's Embarcadero is a Telegraph Hill boy and from childhood has been identified with the Crowley interests. For the past twenty-five years he has been on that firm's payroll, steadily rising in position. He knows the practical operating game with the best of them, and to him there are no obscure angles in the business.

Up-to-Date Cannery Tender

THE Amelie is a modern, up-to-the minute, cannery tender owned and operated by P. E. Harris & Company of Seattle. She is 86 feet long by 18 feet 6 inches beam and will carry about 35,000 salmon. She is propelled by a 165 horsepower Atlas-Imperial diesel engine, and is equipped with a large electric power plant for a craft of her size.

A generator run by belt from the main engine shaft is used to charge a 56 cell bank of storage batteries. Power thus stored runs the auxiliaries. These include many novel features seldom found on a vessel of this type. The winch for brailing fish traps, hoisting anchors and warping ship, or handling any heavy general cargo carried, is electrically operated.

A fish elevator of novel design is also run by an electric motor. This device is installed principally with the idea of minimizing damage to fish in handling.

All the pumps are electrically driven. For taking care of the lubricating oil an electrically driven De Laval centrifugal oil purifier was installed.

A windmill driven skimmer on the Klamath River.

Auxiliaries~Ship Supplies~Marine Equipment

American Trucks on British Docks

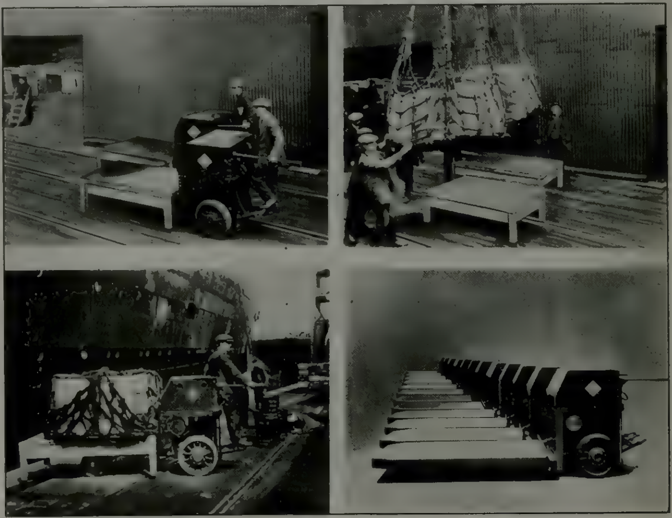
IN an endeavor to speed up and decrease the cost of handling shipments at the sheds of the Southampton Docks, operated by the Southern Railway, England, the management investigated the possibilities of using electric industrial trucks. After nine months of intensive tests handling many kinds of merchandise with various makes of industrial truck equipment, it was decided in the latter part of 1923 to equip several of the docks with an initial installation of eight Elwell-Parker lift trucks. This order was a fine testimonial for the Cleveland concern, who met intensive competition from many English and American manufacturers.

Each of the trucks has a capacity of 2 tons, is equipped with Edison batteries of 21 cells A-6, 225 ampere hours (which is sufficient capacity to supply power for eight working hours without boosting) and has platform measuring 6 feet 8 inches long by 3 feet 3 inches wide. The truck platform stands 11 inches from the level of the ground when in the lowered position in readiness to pick up a false platform, or as is more commonly called "skid," and when electrically raised, is 4½ inches higher for lifting skid off the ground and conveyance from one point to another.

The handling method adopted is to lift a sling of cargo with ship's tackle from the hold to the dock, placing the load on a skid where a lift truck is able to pick up the load unassisted by running the truck platform under the skid. The truck then carries the load into the shed for temporary storage or direct into the railway car for immediate delivery.

The following figures show the results of one hour's work on various kinds of merchandise regularly handled at Southampton:

	Meat	*Baggage*	*Flour*	*Fruit*
Time	1 hour	1 hour	1 hour	1 hour
Length of run	100 ft.	200 ft.	100 ft.	250 ft.
Number of runs	37	30	28	35
Distance travelled	7400 ft.	12,000 ft.	5600 ft.	17,500 ft.
No. of cases, etc., per truck	25 sheep	12 boxes	20 bags	100 boxes
Average load per truck	27 tons 15 cwt	25 tons 10 cwt	28 tons	15 tons 15 cwt
Men saved	15	14	11	26



Elwell-Parker lift trucks on the Southampton Docks of the Southern Railway, England.

The foregoing data are to show the great economy which may be obtained by use of electric trucks in connection with the handling of different cargoes between transit shed and quayside. It was ascertained from tests that the loading and discharging of the vessels was considerably accelerated, and that each man was able to perform four to five times more work when operating a truck.

Since the initial installation they have standardized on Elwell-Parker lift trucks and Edison batteries and at the present time have 30 odd units including two Elwell-Parker heavy duty four wheel drive tractors for moving heavy transportable articles where horses were formerly employed.

One of their recent committee reports states: "Our experience with battery propelled vehicles in the docks is, both from a point of economy and utility, beyond all praise and easily justifies the somewhat heavy first costs involved."

Trade Literature

General Electric Catalog 6001B supersedes all previous catalogs issued by the company, with the exception of those dealing with railway, mine, and industrial supplies and merchandise products. The complete catalog is issued every two years. The book is 2 inches thick and contains more than 1100 8 by 10½-inch pages and 3200 illustrations.

The catalog is thumb-indexed into 16 sections as follows: generation, wire and cable, distribution transformers, arresters, voltage regulators, switchboards and accessories, meters and instruments, motors, motor applications, industrial control, railway, lighting, industrial heating, miscellaneous, and indexes. In the indexes, products are classified both by subjects and by catalog numbers.

A New Solution for Condenser Troubles

Interesting Method of Coating Condenser Tubes with a Bitumastic Solution Perfected by the Wailes Dove-Hermiston Corporation

ONE large factor in operating costs of steam plants at sea is corrosion of condenser tubing. Many methods for controlling corrosion have been used with varying degrees of success. Much experimental metallurgical work has resulted in improved alloys for condenser tubing and in longer life of tubes. Notwithstanding all of this, there is still large expense in tube renewals and much room for improvement in the control of corrosion.

One of the most recent methods that promises great economies is the coating of the inner tube surface with a thin bitumastic coating. The engineers of the Wailes Dove-Hermiston Corporation have developed a process for the application of such a coating that is proving to be a very decided benefit to the steamship operator.

This process involves the use of a special spraying apparatus by which a finely divided bitumastic mixture can be evenly distributed over the inner surface of condenser tubes and ferrules. This is done in the assembled condenser after the tubes have been warmed by steam on the steam side.

The work can be done very rapidly and at low cost. It results in a very thin, even, smooth, and glossy coating. A second coat is applied as soon as the first has thoroughly dried. There is a very slight loss of vacuum by this method, but this is more than offset in over-all economy through the longer life of the tubing.

All of the practical applications of this method have thus far been with tubing in used condensers, as the solution sticks better on the slightly roughened surfaces of the used tubes. Records of ten condensers in which the bitumastic coating has been in use for a year or more show that out of a total of 28,500 tubes there have been, during that time, only 21 failures.

Such a record should result in a wide use of this method, for leaky condenser tubes are a source of great worry and trouble to the marine engineer and are reflected in high fuel bills and large maintenance costs in the annual balance sheets of steamship operators.

It should be a comparatively easy engineering problem to work out a method of preparing the inner surface of new condenser tubing for the application of Bitumastic condenser solution; undoubtedly tubes processed and coated will soon be appearing in manufacturers' stock lists. When such tubes are available it will be a very simple matter to complete the Bitumastic coating over the ferrule and thus seal condenser water surface against corrosive action.

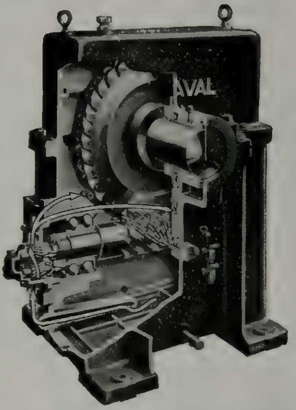
The Wailes Dove-Hermiston Corporation maintains offices in the Matson Building, San Francisco, with a competent technical staff, who will be glad to assist any steamship owner in the control of corrosion problems in condensers or in any part of the hull, machinery, or equipment.

The Wailes Dove-Hermiston Corporation have very recently appointed S. J. Porter as manager of the Pacific Coast district. Mr. Porter has had long experience in fighting corrosion, and invites all steamship owners to avail themselves of his experience in assisting to solve their problems of maintenance.

Positive Pressure Oiling System for Worm Reduction Gears

THE worm, wheel, and bearings of the ordinary worm reduction gear are lubricated by a splash system. The worm is allowed to dip in the lubricant and the oil thrown off from the gear is allowed to find its way down the sides of the case to the bearings. When used with the splash system the worm reduction gears made by the De Laval Steam Turbine Co. of Trenton, New Jersey, are supplied with special channels for carrying the oil to the bearings, and with special means for taking some of the oil off the wheel without it being thrown off and transmitting that oil to the bearings. Splash oiling, however, is not sufficient where the worm is driven at high speed or a considerable amount of power is transmitted.

For high speeds or for the transmission of high powers, the De Laval reduction gear is therefore provided with a forced feed system of lubrication. The worm threads are supplied by a spray of oil and all of the bearings receive oil under pressure, thus insuring copious lubrication and the continual circulation of the oil supply. The oil is drawn through a large bronze strainer located at some distance above the bottom of the oil reservoir by a pump which delivers it through passages in the casing to spray nozzles located on both sides of the worm, and also to all bearings. The oil passages are so arranged that they can easily be cleaned and the oil spray nozzles can be taken out without disturbing piping. When desirable, an oil cooler can be connected into the system. The oil pressure is maintained automatically.



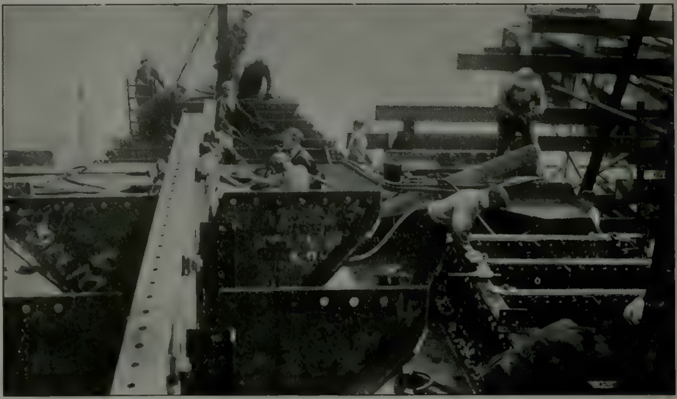
Phantom view of a De Laval worm gear, showing the positive pressure oiling system.

The supplying of oil by pumping rather than by splashing eliminates excessive heating through churning of the oil by high speed worms, avoids foaming of the oil due to such churning, and insures a continuous positive feed.

Orders for Equipment for Steamship Malolo Placed by Builders

The award of several contracts for construction materials and equipment for the steamship Malolo have been made by Wm. Cramp & Sons, Ship & Engine Building Company. Among these are the following:

The order for the fire extinguishing system has been placed with the **Foamite-Childs Corporation.** This system will consist of two steel solution tanks, together with an arrangement of steel mixing tank, vertical duplex steam pump for recharging tanks, and several approved marine type fire extinguishers, together with control manifolds, piping, valves, hose and solution distributors so arranged as to adequately protect the entire area of boiler rooms and fuel oil filling stations. This system is to conform in every respect to the latest marine engineering practice, and will meet all the requirements of the U. S. Steamboat Inspection Service, Lloyds and American Bureaus of Shipping. Distributors will be installed in sufficient numbers and suitable locations to protect all tank top and bilge areas in boiler rooms and filling stations. In addition, there will be a number of hose stations. The system will be controlled from a manifold in the engine room. A number of 2½ gallon marine type splash proof portable hand extinguishers will be installed.



The Malolo, looking aft from the tank tops.

The **Kingsbury Machine Works** of Philadelphia has received the contract for making the thrust bearings for the propeller shafts of the Malolo. This will consist of two double horizontal equalizing shoe thrust bearings of the integral collar type. The shoes will have babbitted faces on forged steel bodies. The leveling plates are to be forged steel and the base rings of steel castings. The contact points between shoes and leveling plates are of hardened steel. In addition to these thrust bearings, the same company will furnish one set of spare shoes for the bearings. These bearings are to receive the thrust from the twin propellers of the steamship Malolo, driven by twin turbines of 12,500 horsepower, each under a working pressure of 280 pounds per square inch, from a battery of 12 Babcock & Wilcox boilers. This is the highest working pressure used on a passenger steamship. The Malolo's main engine room power plant is the most powerful geared turbine plant ever placed in a merchant steamship, and will drive her at a sustained sea speed of 22 knots.

One of the 41½ ton spectacle frames of the Malolo in place.

The National Tube Company of Philadelphia has been given the contract for the seamless drawn steel tubing for the main steam lines in the engine and fire rooms, which consists of 74 pieces, with a total length of over five hundred feet. This seamless steel tubing is to be inspected and tested in accordance with the requirements of the U.S. Steamboat Inspection Service, Lloyds, and the American Bureau of Shipping, with the exception that the minimum elongation will be 15 per cent.

An order for the angle, globe, and cross valves has been placed with the **Crane Company.** This order covers seventeen items, ranging from ¾-inch heavy globe and angle valves to 6-inch extra heavy marine globe valves and heavy standard angle and globe valves of the same size.

The International Silver Company of Meriden, Connecticut, has received the order for the silverware of the steamship Malolo. This is the largest order for silverware that has ever been placed for an American built ship.

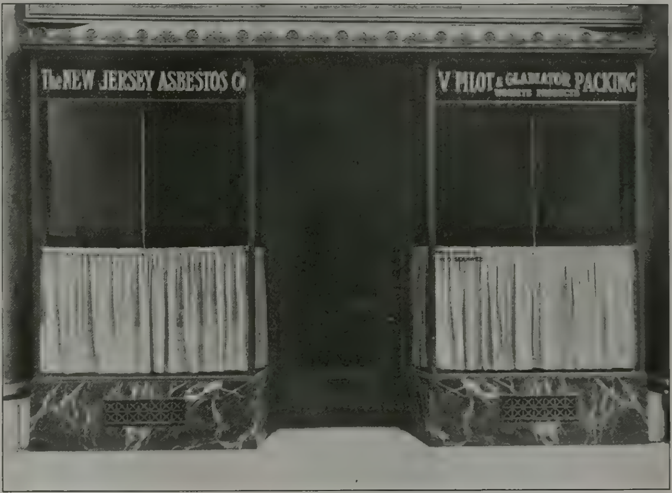
A New Packing Merger

The New Jersey Asbestos Company absorbs the Renown Packing and Supply Company of San Francisco and Opens New Western Headquarters under the Management of Bill Squires and Ray Jones

KEEPING pace with the development of Pacific Coast shipping, The New Jersey Asbestos Company announces the opening of a convenient and modern office and stockroom at 37 Spear Street, San Francisco.

W. D. "Bill" Squires and R. I. "Ray" Jones are joint managers under the expansion program, designed to give complete service to marine organizations in the Pacific trades. In appointing Mr. Squires and Mr. Jones to the position of Western managers, the New Jersey Asbestos Company has included in their territory the Hawaiian Islands and Philippine Islands. The San Francisco headquarters are already open and carry a complete stock of "V" Pilot and "Gladiator" packings and Woodite products.

"Bill" Squires is a leading authority in his line, having specialized in packing problems on the Pacific Coast since 1900. He was formerly manager of the Anchor Packing Company, and has owned his own business. His experience has been very large in both marine and industrial work. He is without doubt one of the best known experts in the packing field.

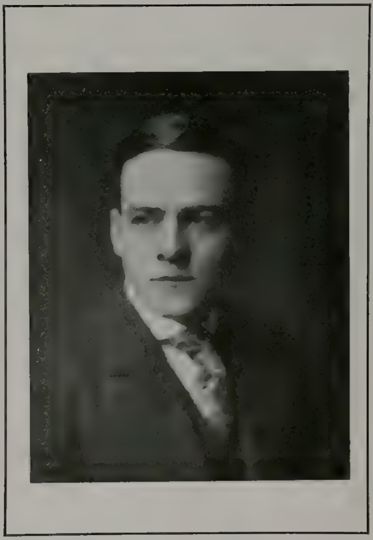


Street front of the new western headquarters of the New Jersey Asbestos Company.

Ray Jones has been actively engaged in operating and engineering affairs in western waters for many years. It is interesting to note that he is the son of the late Frank A. Jones, who was National President of the Marine Engineers Beneficial Association, and who succeeded General George Uhler to that position. General Uhler recently retired as chief of the United States Steamboat Inspection Service.

The New Jersey Asbestos Company is one of the best known packing manufacturers in America, being the sole producers of "V" Pilot and Gladiator packing and originators of asbestos gaskets.

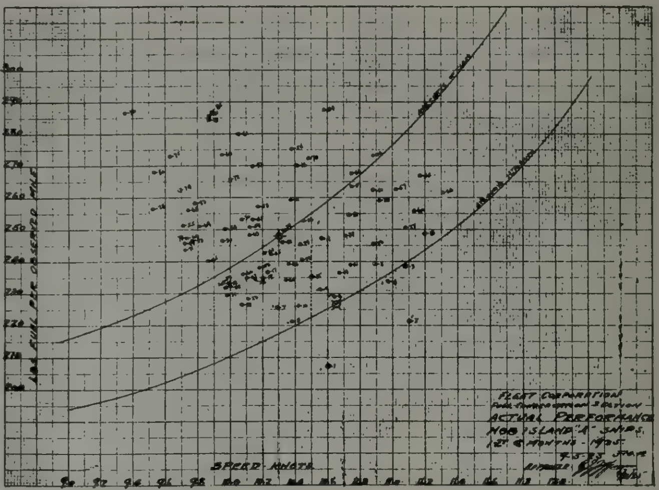
At the left W. D. Squires, at right R. I. Jones, joint managers of the western division of the New Jersey Asbestos Company, including Hawaii and the Philippine Islands. These executives were the former owners of the Renown Packing and Supply Company of San Francisco, and have had many years of experience in catering to the needs of marine engine rooms on the Pacific Coast. The Renown Packing and Supply Company is aborbed in the new arrangement.



The Shipping Board Honor Roll

Hog Island Vessels and Coen Oil Burners Show to Advantage in Latest Award

THE Fuel Conservation Department of the Emergency Fleet Corporation has an excellent opportunity to observe performance of vessels and to improve those performances by setting up good-natured rivalry among chief engineers and captains. In order to accomplish this end, the department established standards of fuel economy performance for each class of vessel under operation and constituted an honor roll and an honorable mention roll for each class. These standards include both sea and port performance, and they have been very beneficial in promoting economy on Shipping Board vessels.



Each engineer is provided with the standard chart for the class to which his vessel belongs. With the aid of this chart he can check up on the performance of his power plant. By careful attention to details, he may achieve the honor roll. To do so he must show an average performance for six months' period equal to 95 per cent of the showing made by the leader in the class, or he must show a 25 per cent improvement over his own record for the last six months and an average for the last voyage equal to 90 per cent that of the leader.

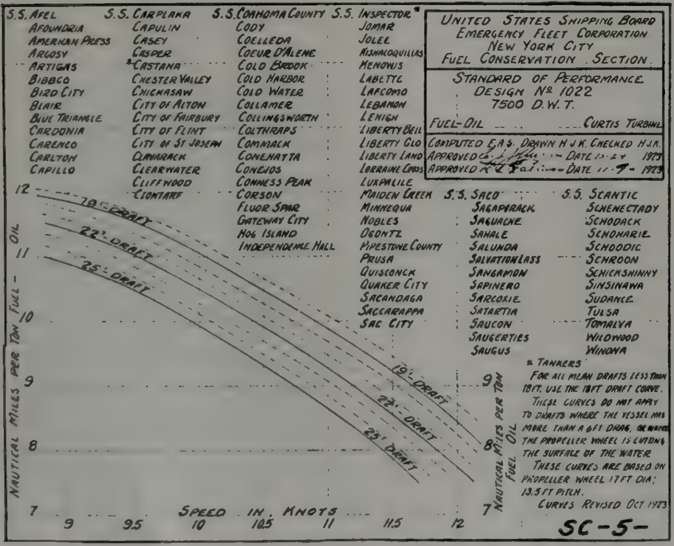
Since the Emergency Fleet Corporation now has in operation 293 cargo vessels and 25 passenger liners, it is evident that the aggregate result of this conservation work forms a very respectable saving. The cargo steamers covered 5,965,264 miles during the first six months of 1925. Of these vessels 85 are in the Hog Island 7500-ton class, and these vessels covered 1,742,922 miles in the period above mentioned.

We reproduce herewith two charts, one showing the standard performance set for the Hog Island 2500-ton class steamers, and one showing the actual performance. Forty-six of these vessels were on the honor roll for the first half of 1925 and forty achieved honorable mention.

It will be remembered that these steamers are all fabricated hulls, Scotch marine type boilers, and geared turbines. The performance as a class is very praiseworthy and reflects great credit on the Emergency Fleet Corporation's shipbuilding organization at Hog Island.

A noteworthy feature of this record is that Coen oil burners were in use on twenty-five out of the forty-six honor roll ships and on twenty-seven out of the forty honorable mention roll ships. This is a wonderful record and we congratulate the Coen Company on the remarkable showing made by their product in this great contest.

The Coen Company, manufacturers and distributors of the oil burner that bears the name, maintains offices in all principal ports, with headquarters in San Francisco. A competent engineering staff is prepared to cooperate in solving all combustion problems.



Book Reviews

PRACTICAL MARINE DIESEL ENGINEERING, by L. R. Ford. 512 pages profusely illustrated with halftones, diagrams, and tables; bound in red buckram with gold stampings. Published by Simmons-Boardman Publishing Co. of New York.

This is a very practical book, especially intended to serve the needs of the operating marine engineer seeking for a working knowledge of the diesel engine as applied to marine propulsion. The theory is covered very simply and yet sufficiently in the first three chapters. The next five chapters are devoted to Diesel Engine Construction, being conveniently allocated to Major Fixed Parts, Major Running Parts, Minor Running Parts, Accessory Running Gear, and Miscellaneous Accessory Equipment.

Four chapters are used to describe the principal characteristics of the majority of the commercial diesel engines now on the American market, and of the balance of the book, twelve chapters indicate the problems of practical operation and their solution, while the last chapter directs the steam marine engineer along the path which leads to a full motorship license.

This book should be of service to every marine engineer afloat or ashore. It is the only book we have seen which deals directly and simply with marine diesel operating problems.

SHIP MODELS, HOW TO BUILD THEM, by Charles G. Davis, naval architect. 140 pages, profusely illustrated with drawings and halftones; bound in blue buckram with gold impressions. Published by the Marine Research Society of Salem, Massachusetts.

This is Number Eleven in a series of marine books published by the Marine Research Society and is fully up to the excellent standard set by the first ten. It treats fully the subject of model making with particular reference to sailing ships. There are many fine illustrations of models of different types of hull and sail plans.

The text of this book, after giving the necessary instructions in a general way covering the principles to be applied in model making, takes up the modeling of the famous clipper ship Sea Witch, and carries the reader through each operation, step by step, in a most practical and interesting manner. In a pocket on the back cover there is a scale drawing of the developed lines of this great ship and a sail plan showing her spread of canvas.

COMMODITY MARKET TERMS, by Cuthbert Maughan. 300 pages. bound in green buckram with black stampings. Published by Effingham Wilson, London, England.

This very practical work for all marine men and foreign traders, forms Volume 2 in the author's series on Trade Term Definitions. It covers practically every known trade in a discussion of words and phrases used in the conduct of international trade and the methods of dealing in products.

The author has contributed much of this material in articles published in the London Times Trade and Engineering Supplement, and this material is rearranged and amplified in the book. Having access to the world's greatest experts in various lines of trade, he has drawn freely from their experience and has arranged and developed the material with great skill and in a manner to make this dry information most interesting. This book, it seems to us, will be very valuable to world traders, bankers and marine underwriters.

THE LAW OF CHARTERS AND BILLS OF LADING, shortly explained, by Sanford D. Cole. 130 pages, bound in blue buckram with black stampings. Published by Effingham Wilson, London, England.

Sanford D. Cole, a barrister-at-law, has written a number of brief explanatory texts covering various phases of marine law with great clarity and with sufficient detail to meet the practical every-day needs of the shipowner and operator. The volume at present under review covers those fundamental essentials of sea freighting—the Charter Party and the Bill of Lading. The meat of the nut in shipping is here compressed into a small space and the busy shipping man ought to own and read this book. It is small enough to be conveniently carried in the pocket and contains enough solid meat reference, example, and precept to furnish with much technical wisdom any shipping man who wishes to study.

Anton J. Houda

(Continued from Page 69)

first steamers. To young Houda, Cap. John Nelson was like a father. He had known the captain for years and from the kindly old seaman had learned many of the ways of the sea as a boy, and naturally chose the North Fork as a start in the shipping game. In those days the position of purser of a vessel like the North Fork was not like the same job on the modern ocean liner, but the teachings were more valuable. The work brought young Houda much knowledge, and though his natural bent was for sea business, he always gives Captain John Nelson most of the credit for his advancement. It was not long before Houda was taken on at the head office in San Francisco, and steady promotion followed until his present position was attained.

The company also expanded and is now one of the largest out of San Francisco engaged in coasting work only. In fact their business is confined to this, overseas freights not being considered at all. At the present time they average eight to ten sailings per week, with a volume of business running well into sixty thousand tons per month. Besides the fleet under the company's flag, several other coasting steamers are chartered. All ports from Mexico on the south to British Columbia north are included in the traffic. So it is seen that attention and knowledge of the business is necessary. That Mr. Houda has this and directs things correctly is proved by the fact that money is made and matters go along very smoothly and quietly. Among the employees of the company Mr. Houda is spoken of most highly, as he is invariably pleasant and affable, a friend to those who work under his supervision and always ready to help any of them over knotty problems and difficulties. This makes for good results.

Mr. Houda has his home on the top of Hyde street hill, where he can see from his windows the ships leaving and entering San Francisco Harbor. This is his hobby and pleasure. He says there is to him always something fascinating in watching the water traffic. Had he taken up the navigation end of the business he would without doubt have made a high mark in the handling of vessels. The sea lost a splendid ship master, but the traffic and freight business was gainer thereby. Mr. Houda is an active member of the Commercial Club and the Pacific Traffic Association and is well liked by his associates.

Freights, Charters, Sales

January 16, 1926.

SINCE our last report, the United Kingdom wheat demand has subsided and is now quiet with few full cargoes being placed and not much parcel business.

Lumber to Australia, Japan, and the West Coast of South America has remained firm, but during the past week foreign tonnage is plentiful for Feb., Mar., Apr., and desirous of long time charters which would apparently point to a weakening of these markets for the spring months unless some other world market presents a demand for tonnage.

The following steamers have been reported fixed with grain from the North Pacific to the United Kingdom/Continent: British stmr. Ethelfreda, Jan. loading, Strauss & Co.; British stmr. Cranley, 35/6, Jan./Feb. Kerr Gifford & Co.; British stmr. Glen, 35/-, Jan.; Dutch stmr. Aalsum, 35/-, Jan. Wilmer Grain Co.; Belgian stmr. Gallier, 35/9, Feb. Strauss & Co.; British m.s. Vinemoor, 36/-, Jan.; British stmr. Vulcan City, Jan.; British stmr Valdura, Jan.; British stmr. Grelbank, 35/-, Jan.; British stmr. Grainton, Jan./Feb.; British stmr. Mabriton, Feb.; British stmr. Keltier, Jan. Balfour Guthrie & Co.; British stmr. Selviston, Jan./Feb. Balfour Guthrie & Co.; British stmr. Simonburn, Jan./Feb. Balfour Guthrie & Co.

For grain to Shanghai the following steamers are reported: Japanese stmr. Kohnan Maru, Jan. Balfour Guthrie & Co.; Japanese stmr. Taiyu Maru, same; Japanese stmr. Yomei Maru, same.

The following lumber fixtures for Australia are reported: British stmr. Strathlorne, $13.75, Feb. J. J. Moore & Co.; British stmr. Strath, $14, Jan./Feb.; Norwegian m.s. Nordbo, Jan./Feb. W. L. Comyn & Co.; British m. s. Larchbank, Pacific Export Lumber Co.

The following steamers are reported fixed with lumber to the Orient: Japanese stmr. Sydney Maru, lump sum, Dec./Jan.; British stmr. Aymeric, Feb. Pacific Export Lumber Co.; Japanese stmr. Rozan Maru, Dec. Nakagawa & Co.; British m.s. Alynbank, Jan./Feb. Pacific Export Lumber Co.; Japanese stmr. Shinkai Maru, Jan.; Japanese stmr. Boston Maru, Yamashita Co.; British stmr. Norwich City, H. R. MacMillan Export Co., Norwegian stmr. Talabot, Jan., H. R. MacMillian Export Co.

For lumber to the West Coast of South America, the following fixtures are reported: American schr. Undaunted, Columbia River to Callao, Jan. Otis McAllister Co.; Norwegian stmr. Evanger, Columbia River, Puget Sound to Talara and Callao, Jan./Feb. Balfour Guthrie & Co.

The following stmrs. are reported fixed with lumber to the Atlantic Seaboard: Pan. m.m. Monterey, North Pacific to Havana, $16, Jan. Foster Wyman Lumber Co.; American stmr. Carolinian, Willapa Harbor and Puget Sound to New York, Jan. Krauss Brothers Lumber Co.; American stmr. Arizonan, Columbia River and Puget Sound to Boston, New York, and Baltimore, Jan. Babcock Angel Lumber Co.; American stmr. Robt. Johnson, Yaquina Bay to Florida, Dec./Jan. C. D. Johnson Lumber Co,; British stmr. Canadian Pioneer, British Columbia to Florida, South Alberta Lumber Co.; British stmr. Canadian Trooper, same; American m.s. Oregon, Puget Sound to one port Florida; American tank stmr. Freeport Sulphur No. 1, North Pacific to Tampa, Jan. Krauss Brothers Lumber Co.; American stmr. Herman Frasch, Puget Sound to one port Florida, Jan. Nettleton Lumber Co.; British stmr. Canadian Seigneur, North Pacific to Florida, Jan. South Alberta Lumber Co.; American stmr. Griffdu, same, C. D. Johnson Lumber Co.; American ship Monongahela, same; American stmr. W. R. Chamberlin, Jr., same, Feb. charterers not mentioned; American stmr. Bertie M. Hanlon, San Francisco to Miami, hardwood, Kirchman Hardwood Lumber Co.; American stmr. Depere, North Pacific to Florida, Krauss Brothers Lumber Co.; American stmr. Jeptha, same, charterers not mentioned; American stmr. Point Loma, Yaquina Bay and Columbia River to Florida, Jan. C. D. Johnson Lumber Co.; American stmr. Mukilteo, Puget Sound to Tampa, Jan.

The following steamers are reported taken on time charter; Norwegian stmr. Rigi, one trip, delivery Australia, redelivery Australia via North Pacific, 3/10½, H. R. MacMillian Export Co. (spot); Japanese stmr. Meiten Maru (or substitute) North Pacific to Japan, Dec. Suzuki & Co.; British stmr. Indian City, 12 months, delivery and redelivery North Pacific, Feb. Pacific Export Lumber Co.; Norwegian m.s. Hallfried, delivery Honolulu, redelivery Australia via North Pacific, General Steamship Corp.; Norwegian stmr. Samnanger, one trip, delivery North of Hatteras, redelivery North of Hatteras via North Pacific, W. L. Comyn & Co.; (spot); Norwegian m. s. Austvard, North Pacific trade, one year, South Alberta Lumber Co.; British stmr. Harmattan, two trips British Columbia to North of Hatteras, H. R. MacMillian Export Co.; Norwegian stmr. Mathilda, North Pacific to Atlantic Coast, delivery Hampton Roads, 95c, Jan.; British steamer —City, Pacific trade, 12 months, 4/6, delivery Pacific, redelivery Australia, Mar.

The following tanker fixtures are reported: British stmr. Tascalusa, Port San Luis to Wellington, New Zealand, 85c, Jan. Union Steamship Company; American tanker Freeport Sulphur No. 1, Columbia River and Puget Sound to U. S. Atlantic ports, Jan./Feb. Krauss Brothers Lumber Co.; American tanker Priscilla, California to North of Hatteras, 75c, Jan. clean.

The following sales are reported: American stmrs. Jeptha, Depere and Derblay, Shipping Board to Alaska S.S. Co.; Seattle, $270,000; American schr. S. N. Castle, Alaska Codfish Co. to John West; American tank stmr. Radiant, Standard Transportation Co. to Union Oil Co.; American m.s. Patterson, C. K. West to Capt. C. T. Pedersen.

PAGE BROTHERS, Brokers.

Trade Literature

General Electric steam turbines rated at 500, 600 and 750 k.w. are described in **Bulletin GEA-235**, just issued by the **General Electric Company**, Schenectady, N.Y. The general principles and advantages of steam turbines are discussed, and sections and steam path diagrams are shown.

The type D-54 mechanical drive turbine, intended for the driving of centrifugal pumps, blowers, and other classes of mechanical drive, is described in **Bulletin GEA-197.**

PUBLIC LIBRARY

Marine Insurance

Developments of the Month

By CHARLES F. HOWELL, Contributing Editor

SUMMARY

What is a "Disbursement"?

Watch your Hooks!

A Record Shipment of Silk

Seaworthiness

Conditions in Florida

George S. Bull at Miami

Watch Your Step on

Florida Shipments

READ AND LEARN

THERE is a word in hourly use in marine insurance that is more or less a mystery to laymen, and, indeed, to many brokers and agents as well. That word is "disbursements;" and its insurance use is especially with reference to hull covers. A line or two of elucidation may not be amiss.

"Disbursements" means money expended in making a vessel ready for sea, such outlay being usually for wages, stores, etc. Sometimes these prepayments are included under the insurance on freight or hull, and it is therefore necessary to exercise care that they are not again insured under "disbursements;" for that would mean double insurance. Under the familiar form of marine policy the coverage of the disbursement interest has to be done in strict compliance with the underlying principles of the contract; that is to say, the assured must have a valid insurable interest in the venture, and the insured subject matter must be exposed to the perils insured against. It is also essential that the loss of the venture shall result in a direct loss to the assured. Therefore, to be valid, the disbursements must be directly related to the vessel, cargo, or the earning of freight, and actually at risk during the insured voyage.

Let us suppose, for example, that the owner of a vessel is insured under an annual policy and that he desires to place the vessel in a certain cargo trade requiring special temporary fittings in the hold. He may expend a considerable sum of money in installing such temporary fittings which will not be covered under his hull policy. Should he propose entering the ship in the special trade for a number of voyages he will not be covered for his complete capital outlay by the insurance of the freight on any particular voyage; he therefore insures his expenditure under the term "disbursements."

In general practice, however, the term "disbursements" is used largely to describe interests which are not represented by an actual cash outlay. To illustrate: It is often found that anticipated earnings and numerous other expectant interests are insured under this term. The word, when so used, does not comply with the principles of a valid marine insurance contract and, accordingly, the insurance is usually made under a P.P.I. (Policy Proof of Interest) or a F.I.A. (Full Interest Admitted) form, which makes the policy an honor document.

In connection with hulls, the disbursements clause in the full form hull policy permits the assured to place 40 per cent insurance on disbursements, commissions, freight, anticipated freight, etc. Owners of vessels use this clause to reduce the cost of their hull insurance. The interests described above, representing about 40 per cent of the full form insurance, are covered against "total and/or constructive total loss only," and the insurance on hull and freight actually at risk is reduced by that amount. The amount of insurance placed on the full form policy is sufficient to take care of all partial losses, and in the event of total loss the assured collects the amount of his full form policy plus the amount of his so-called disbursements insurance.

Made Unseaworth by Defective Hook

The Supreme Court of New Zealand recently decided that a defective hook used in handling cargo constituted a vessel "unseaworthy," Seaworthiness, it will be remembered, is one of the essential implied warranties of the marine insurance contract. In the case above alluded to, four cases of merchandise had been shipped by the plaintiff from New York to Auckland. While they were being unloaded one of the cases fell onto the wharf as the consequence of a cargo hook breaking and was smashed. The resulting damage was estimated at £479. The shipping company admitted liability, according to the provisions of Clause 7 of the bill of lading, to the extent of £200 less £150, the value of the case after it had been damaged.

The Court decided that the clause did not bind the shippers, because the vessel was unseaworthy when the accident occurred. It was the judgment of the Court that the carriers made the ship unseaworthy by having a defective hook.

North British and Mercantile Insurance Company, Ltd.
The Commonwealth Insurance Company, of New York
PARROTT & CO., Pacific Coast Marine Agents
320 California Street E. L. BARRY, Manager SAN FRANCISCO

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA and SANSOME

JOSEPH HADLEY,
European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Resident Agent for Oregon
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, MANAGER, PACIFIC NORTHWEST BRANCH

Silk Coverage for Import

According to the best authenticated records, the recent shipment of silk from the Far East to New York, via Seattle, in the Africa Maru was the largest ever made. There were 10,124 bales of raw silk and 60 tons of manufactured silk goods aboard the vessel. The value of this cargo was estimated at about $10,000,000. Up to that time, the record shipment had been 8000 bales. This was an interesting circumstance, for more reasons than one.

For instance, it was a fine thing for the underwriters. Insuring silk shipments has long been given a place among the most satisfactory dealings in the whole category of marine insurance. This is because of the excellent experience in that trade. Admittedly, there is a grave hazard of theft and pilferage, and also of fire and water; there is next to no salvage if either fresh or salt water comes in contact with raw silk. But the losses are few because of the superior care in packing and transporting the commodity. Silk is packed in tin-lined wooden cases, and these, in turn, are strapped with stout ⅝-inch steel bands. The cases are carefully stored on the fastest steamers, and hurried overland on special express trains ready for that purpose. This is done because one of the greatest factors in silk shipments is that of market fluctuations in price. In the case of the cargo of the Africa Maru, there were thirty-three express cars waiting at Seattle to carry the goods to New York as soon as they could be discharged and reloaded.

Silk shipments of this character are written "all risks to destination." This includes the hazards of fire and earthquake prior to loading, as well as those of theft and pilferage, war, strikes, and riots. The rate charged on the Africa Maru shipment ranged from 22½ cents to 25 cents per $100 of value. Competition has been responsible for hammering the rate down so low. Five years ago the underwriters would have received 50 cents per $100 for the same risks.

London got the lion's share of the insurance, largely through reinsurance; Japan ranked next, and then the United States. About 20 per cent of the cover was written by American underwriters, almost entirely in New York.

Warranty of Seaworthyness

The importance of the implied warranty of seaworthiness, which is a cardinal principle of marine insurance, was stressed in the findings in the case of the City Motor Trucking Company vs. the Franklin Fire Insurance Company, which was tried before the Supreme Court of Oregon recently, 239 Pacific Rep. 812. The highest authorities on the subject were freely cited by the Court. It should prove of advantage to vessel owners and shippers to take note of them.

"It is an implied condition of marine insurance on vessels, cargo, or freight that the vessel shall be seaworthy, which means that she must be sufficiently tight, staunch, and strong to resist the ordinary attacks of wind and sea during the voyage for which she is insured, and that she must be properly manned and equipped for the voyage." —Hughes on Admiralty, 59.

"In every voyage policy of marine insurance there is an implied warranty that the vessel is in all respects seaworthy, and such warranty can be excluded only by clear provisions of the policy..........This implied warranty of seaworthiness is not limited to cases of insurance upon vessels but applies equally to insurances on cargo, freight, and other subjects of marine insurance."........38 C. J. 1071, 1072, No. 206, 207.

"By far the most important of the implied warranties is that of seaworthiness, which we will deal with first in order. In every voyage policy there is implied warranty that the ship shall be seaworthy for the voyage when she sails, by which is meant that she shall be in a reasonably fit state as to repairs, equipment, crew, and all other respects, to encounter the ordinary perils of the voyage insured at the time of sailing on it." ....2 Arnould on Marine Insurance and Average (10th. Ed.) 889, No. 686.

"The warranty of the ship's seaworthiness is equally implied in a voyage policy, whatever be the subject of insurance. It therefore applies no less to insurances effected by the owner of the goods than to those effected by the owner of the ship."........2 Arnould on Marine Insurance and Average (10th. Ed.) 892, No. 689.

After the plaintiff has made out a prima facie case, the burden of proof of seaworthiness is then on the defendant (the underwriter) when the matter is an issue in the case. In support of this contention the court cited 2 Arnould on Marine Insurance and Average (10th. Ed.) 934, No. 725, where the rule is stated thus:

"The burden of proof on the issue of unseaworthiness is on the underwriter. Where, however, a ship soon after sailing founders, or becomes so leaky or disabled as to be unable to proceed, and this cannot be ascribed to any violent storm or other adequate cause, the fair presumption is that it arose

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from causes existing at the time of her sailing, and consequently that she was not then seaworthy."

It may be added for the information of those who are not close students of marine insurance that the Arnould, so frequently alluded to above, is the celebrated English authority who has stood for years as the foremost in this particular science.

Conditions Bad at Miami

Underwriters of all branches, whether fire, marine, life, accident, or what not, have been very much disturbed by the recent revelation of conditions now existing at Miami, Florida, as set forth in a highly important and dependable report made during the closing days of the past year to the American Institute of Marine Underwriters by Captain George S. Bull. The captain was sent down to the boom city to look things over and give insurance men an accurate idea of the hazards developed there by the rush of speculators and the pouring of their equipment into the limited harbor. He spent several days studying the situation. He is one of the ablest and most experienced surveyors on the staff of the United States Salvage Association, which is one of the Marine Insurance Syndicates, and what he reported on his return has been giving insurers a very bad time ever since.

It appears, from Captain Bull's report, that Miami has at hand about every element that goes into the making of a wholesale conflagration in her harbor, and with a totally inadequate fire fighting equipment to oppose it. He found that the bottom, at the anchorage, to be of coral and very poor for holding, and the position of vessels there most perilous as they are exposed to all weather, from North through East to South. An East blow would drive them on the shore. "Barges," said he, "would be helpless." The channel is very narrow, but 17 feet in depth, with a bottom of sand and coral. A strong set on either starboard or port quarter is encountered on entering the channel from the sea, caused by the damming effect of the fill across the bay on which the causeway is built, and vessels frequently go ashore at the mouth of the channel and block the passage completely.

"Congestion of freight along the city docks," says the Captain, "is chronic. As soon as freight is hauled away, the space is filled from steamers discharging, and the handling of freight results in much breakage. The predominant part appeared to consist of furniture and household goods, but merchandise of every other sort is also stacked in the sheds.......The Meteor dock presents a scene which beggars description. Here freight discharged into lighters from Munson Line steamers, berthed at Fisher's Island, has been heaped in the open with no dunnage between it and the bare ground and no tarpaulins to cover it. The freight consisted of furniture and household goods of every conceivable kind. Bundles of mattresses were open and the mattresses were lying on the bare ground and nobody seemed to care. Chairs, bureaus, and bedsteads, from which the cratings had been torn, were broken and more or less scratched. It is doubtful if any one piece of this shipment will be delivered in undamaged condition."

The captain found an acute shortage of lighters. Steamers were discharging dressed lumber over the side and rafting it ashore. All stevedore work is done by inexperienced colored labor, resulting in much breakage and damage to freight. Tug hire for vessels going aground comes high. The rate for pulling on one tide is $300 per tug. There are no facilities for making repairs.

Worst of all is the fire hazard on the main water front. There is a lack of fire fighting equipment on all wharves except the city docks. The crowding of vessels together in the narrow channels would make it extremely difficult,

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if not impossible, to isolate a fire to one vessel. "Last of all," says the Captain, "is the utter disregard everywhere of all ordinary fire prevention rules." Storage oil tanks, hydrants without hose, burning garbage and refuse within 120 feet of oil storage tanks, ground soaked with fuel oil waste where everybody walks, etc., etc., combine to make up a condition fraught with the gravest fire perils. Miami has no fireboat, and the congestion along the docks would seriously handicap the use of the city fire trucks.

A full meeting of the Marine Institute heard the report and lost no time in appointing a special committee instructed to communicate with the City Manager of Miami and point out the seriousness of the situation and offer to cooperate in relieving them. Another committee was appointed for the purpose of advising members as to the underwriting standpoint, relative to terms, conditions, etc., to be observed in writing risks for Miami.

The City Manager of Miami responded to the overtures of the underwriters cordially and accepted their offer to send a representative down there to aid where he could. Captain Bull was duly appointed for this work and he left for Miami on January 1.

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THE value of part time education in commercial subjects has long been appreciated by the American public, as evidenced by the wide-spread interest in correspondence schools and lecture courses throughout the country; but it is only recently that we have realized the importance of a knowledge of marine insurance and its kindred topics to the business men of our great maritime cities.

In London, the underwriters at Lloyds have for many years provided lecture courses for their younger members, and the Chartered Insurance Institute of that city affords a thorough course, culminating in a difficult examination. The student who successfully passes the test is granted a certificate, which in effect is a prerequisite to obtaining a position with a reputable firm. Such requirements have been largely responsible for the enviable position which British shipping and insurance now occupy in the commercial world.

The Underwriters Association of New York City have also maintained an educational institute for several years, although their formal requirements are not so clearly defined as those of the English organizations. It was not until 1923 that the demand for some form of organized study of marine policies induced the University of California, through its Extension Division, to offer experimental courses to the public. The appreciation of these courses has been so enthusiastic that the University officials have announced the continuance of the subject in their regular curriculum, and set the date for the opening of this year's lectures on Wednesday, February 3.

The course will consist of a series of ten 1½-hour lectures upon succeeding Wednesday evenings, to be given at 6:30 p. m. in Room 234 Pacific Building, Fourth and Market Streets, San Francisco.

The class will be conducted by James A. Quinby, who has been connected for several years with Geo. E. Billings Co., a leading San Francisco firm of general insurance brokers and average adjusters. The subjects treated will be basic in nature, including a discussion of both hull and cargo coverage, with the aim of providing a useful working knowledge of the field for traffic managers, shippers, and other users of marine insurance, as well as for those occupied in dispensing that commodity. An outline syllabus will be furnished at each meeting, together with sample copies of all policies, bills of lading, and other documents under discussion; so that by the conclusion of the course, the student will have the material for the construction of a valuable reference note book.

For the man or woman whose field of endeavor includes the handling of vessels or the transportation of goods, the study of sea insurance presents the fascination of romantic interest, as well as a distinct and extremely tangible opportunity for self advancement. Certain forms of insurance may well appeal to the average mind as being dry and monotonous, but in the marine field we follow ships on far voyages—and the salty tang of rare sea-borne goods.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Bright Prospects for Shipbuilders

With more real business and much better prospects in evidence than have been visible to the marine and allied industries in many months, the close of 1925 ushered in the New Year under what we believe to be very favorable conditions. To begin with, we are in receipt of a report that the Ocean Steamship Company of Savannah is considering the construction of two passenger and freight ships for the Atlantic coastwise trade. Official details are not yet available.

Red D Line Planning Steamer.

Theodore E. Ferris, naval architect of New York, is working on plans for a new coastwise passenger and freight steamer for the Red D Line. The new vessel is to be similar to the Carabobo, built for the company by the New York Shipbuilding Corporation in 1924. The Carabobo is 305 feet long, 48 feet beam, 22 feet draft. She has a speed of 12½ miles and is propelled by steam turbines developing about 2200 shaft horsepower.

Plans for Interisland Steamer Nearing Completion.

Gibbs Brothers, naval architects of New York, will have the plans and specifications for the new passenger and freight steamer for the Inter-Island Steam Navigation Co. of Honolulu ready in about sixty days. The company has appropriated $1,750,000 for the construction of the vessel.

To Build Diesel Tug.

The Inland Water Ways Corporation, Washington, D.C., has under consideration the building of a diesel driven towboat. Brig.-General T. Q. Ashburn is head of the corporation.

Shipping Board to Build?

It is anticipated that the Shipping Board will shortly request Congress to authorize the Board to build two large modern first-class passenger vessels to be used to supplement the limited number of such vessels now under the American flag. Plans and specifications have recently been prepared for a passenger vessel of the highest type, to be 726 feet long, to have a speed of 20 knots, with capacity for carrying 1600 passengers, and with an estimated displacement of 44,500 tons. Two vessels of this general type and kind will be constructed if Congress will authorize the construction and appropriate the necessary funds.

L. E. Geary, Seattle marine architect, has completed designs for a 100-foot diesel cruiser for Mrs. M. H. Adamson of Los Angeles. The boat will have a beam of 20 feet, will be powered with 100 horsepower diesel engines, and will have accommodations for seventeen persons. It is quite possible the Blanchard Boat Works of Seattle will build the cruiser.

Preparations are being made at the Navy Yard, Mare Island, California, for the keel laying of the submarine shortly to be built there. Bids for dredging work at the submarine dock were opened on January 20.

Recent Construction Contracts

Moore Dry Dock Company Gets Contract for Ferryboats.

The Key System Transit Company, San Francisco, awarded contract on December 27 to the Moore Dry Dock Company for construction of two new steel ferryboats for the Oakland-San Francisco service on a bid of $1,659,703. These ferryboats were designed by Hibbs, McCauley & Smith of San Francisco and are to be the very finest examples of design and construction exemplified in the characteristics of safety, reliability, comfort, economy, and appearance. They are to have turbo-electric propulsion, this type of propelling power having been demonstrated satisfactorily with the company's ferryboats San Leandro and Hayward, built several years ago. Many months were employed by the architects in selecting the type of furnishings and seating equipment best suited to the comfort of the commuters who use this ferry service.

The principal characteristics of the vessels are:

Length over all	276′0″
Length between perpendiculars	256′0″
Breadth over guards	70′0″
Breadth molded	47′0″
Depth molded	21′0″
Passenger capacity	4000
Seating capacity	2340
Normal S. H. P.	2250
Normal speed, knots	14½

The vessels will require ten and eleven months, respectively, to build.

Bethlehem Corporation to Build Ferries.

Contract awards for the start of the New Year include the placing on the East Coast on an order for a new steamer and the reconditioning of another with the Bethlehem Shipbuilding Corporation. This company will build a steam driven passenger and automobile ferry for the Fishers Island Navigation Company, New London, Connecticut, to cost in the neighborhood of $300,000. The vessel will be 150 feet long, 40 feet beam, 10 feet draft, and will be propelled by reciprocating engines developing 800 horsepower.

Bethlehem was also successful bidder for the reconditioning of the freighter Herman Winter of the Eastern Steamship Lines. The present quadruple expansion engine is to be replaced by a new triple expansion engine of 2000 horsepower. The four small boilers are to be replaced by two Scotch or watertube boilers. Similar work may be done later on the steamer Dimock of the same line.

Staten Island to Build Towboats.

Contract for two tugboats for the New York Central Railroad was awarded recently to the Staten Island Shipbuilding Company on a low bid of $199,500 for the two. The tugs will be diesel-electric propelled, 96 feet long, 26 feet beam, and 10 feet 3 inches draft, of 650 indicated horsepower, and 12 miles speed.

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DISSOLVED ACETYLENE

Los Angeles Shipbuilding and Dry-Dock Corporation Start Work on the World's Largest All Steel Pleasure Yacht.

The Los Angeles Shipbuilding and Drydock Corp. of Los Angeles, California, started work January 12 and expect to finish by July 1 on the construction of the world's largest all steel pleasure yacht, which is being built for Don Lee of Los Angeles and San Francisco. The new craft, which will be 141 feet in length with 23 feet 6 inches beam, was designed by Harold Lee, of Lee & Brinton, well known naval architects of San Francisco, and will be propelled by twin screws driven by two 300-horsepower diesel engines.

Don Lee is a well known yachtsman and at present owns the yacht Invader. The construction of the new boat represents the first activity in what L. E. Caverly, general manager of the Los Angeles Shipbuilding and Drydock Corporation, feels will be a year of much construction in the pleasure boat field in the southern waters.

Navy Yard to Launch Submarine Tender Holland.

The submarine tender Holland, the first vessel of her type built by the navy, is scheduled for launching about February 15 at the Puget Sound Navy Yard, Bremerton, Washington. She will be commissioned about April 1. The Holland is 506 feet over-all, 61 feet beam, 21 feet draft, and with a displacement tonnage of 10,600. She will serve as a mother ship for submarines and as a floating base and for repair and supply purposes. She is named for John Phillip Holland, inventor who designed the first submarines for the American Navy in 1875.

New Yacht For H. O. Harrison.

A notable addition to the fleet of the San Francisco Yacht Club will be H. O. Harrison's new craft, which is to be built by John Twigg & Sons, of San Francisco. This vessel will be 92 feet long, 16 beam, with a draft of 5 feet. She has been designed by Harold Lee of the firm of Lee & Brinton, naval architects and the best modern skill and science has been expended in the work. The craft will be constructed with oak frames and double Honduras mahogany planking. A gyroscopic stabilizor will be built in, which should ensure stability and comfortable seagoing.

Her power will consist of two sets of Winton gas engines of 600 horsepower, driving two screws, giving a good cruising speed of 12 to 14 miles. An extra large electric generator of 7½ kilowatt capacity will furnish current for the usual auxiliaries, which include refrigeration with extra heavy pumps. A powerful radio installation will enable the owner to keep in touch with shore interests at all times. Her fuel tanks will give her cruising radius of 1500 miles, so that long voyages can be made.

Accommodations for the owner, guests, and crew will be of the best and most beautifully finished. Deck houses and smoking and observation rooms will be a feature, the whole combining to make a very elegant and comfortable yacht. It is estimated that the cost will be around $85,000.

Eastern Steamship Lines Places Duplicate Order.

Wm. Cramp & Sons Ship and Engine Building Co., Philadelphia, have received a duplicate order from the Eastern Steamship Lines for a passenger and freight vessel. The latest vessel is to be an exact duplicate of the one now undergoing preparations for keel laying at the plant. She will have a length at water line of 378 ft. beam of 55 ft. 6 in. molded depth of 29 ft. 6 in. Propulsion equipment will consist of two Parsons turbines with reduction gears, developing 7500 shaft horsepower. Steam will be supplied by six single-end Scotch boilers. Keel for the first vessel will be laid in February.

American Brown-Boveri Electric Corp., Camden, N. J., has an order for a 130 ft. suction dredge for the U. S. Army Engineers.

Charleston Dry Dock & Machinery Co. has an order for a diesel double-end drive ferryboat for the Cooper River Ferry Commission of Charleston, S. C. The boat is to be 120 ft. long, 35 beam, and 6 ft. 6 in. draft. She will have 360 I.H.P. diesel engines developing a speed of 8 knots.

Defoe Boat & Motor Works has orders for three wooden yachts. Two of these are to be identical and are for I. M. Kirlin and Alex McLeod of Detroit. They will be 55 ft. long, 13 ft. beam, and 3 ft. 9 in. draft, and will have gas engines of 140 horsepower developing 13 miles speed. The third yacht is for John J. Barum of Detroit and will be 65 ft. long, 12 ft. 6 in. beam, 3 ft. 6 in. draft and will have 600 horsepower gas engines developing a speed of 28 miles.

Dravo Contracting Company has an order for 10 steel barges for the Equitable Towing and Transportation Co.; they will also build 28 additional barges for stock.

Howard Shipyards & Dock Co. has an order for a catarmaran type steam ferryboat for Baton Rouge Trans. Co. to be 150 feet long and to be propelled by high pressure steam engines of 500 I.H.P. They also have an order for a maneuver boat hull and a concrete mixer hull for the Vicksburg Engineers; a 100-ft. diesel ferry boat for the Tri-State Ferry Co.; and are building a side-wheel diesel-electric excursion boat for stock.

Midland Barge Company has an order for 2 steel wharf boats for the Baton Rouge Trans. Co. and 12 steel deck scows for the New York State Bureau of Canals.

Congress to Be Asked For More Coast Guard Cutters.

The chairman of the joint committee of Congress on Interstate and Foreign Commerce has introduced a bill to authorize the construction of ten more Coast Guard cutters at a cost of $9,000,000. If the bill passes and Congress makes the appropriation, chances are good that three or four of the vessels will be built on the Pacific.

Shipyard Notes

On December 1, 1925, American shipyards were building or under contract to build for private shipowners 102 vessels of 176,933 gross tons compared with 158 steel vessels of 161,920 gross tons on November 1, 1925, according to the Bureau of Navigation, Department of Commerce. There were 25 wood vessels of 8736 gross tons building or under contract to build for private shipowners during the same period compared with 21 wood vessels of 8263 gross tons on November 1, 1925.

* * *

The Southern Pacific Steamship Lines, otherwise know as the Morgan Line, operating between New York and New Orleans, has had under consideration for some time

Motorship "Boobyalla." Length 281 ft. 6 in. Beam 46 ft. 10 in. Full-load draft, 25 ft. 6 in. Deadweight tonnage, 4000. Propelling power, two 640-i.h.p. McIntosh & Seymour Diesel engines. One of a number of similarly equipped sister ships built by Patterson-MacDonald Shipbuilding Co. for the Australian Government.

Making Commercial Winners from Losers

THE "Boobyalla" and sister ships of her class are wooden vessels built in reponse to the war demand for increased tonnage. All are Diesel-driven and have Diesel-electric auxiliaries. A large number of voyages at an average speed of about 9 knots and with average cargo of 3800 tons shows a daily fuel consumption of 4¾ tons.

Because of the operating economies, due to low fuel consumption of the all-Diesel equipment, together with the smaller crew required, and the greater cargo permitted by the smaller amount of fuel, these wooden ships can compete successfully with steel steamships. In fact they can make paying voyages at rates which keep steel steamships tied up, and at rates under which no wooden steamship could operate.

The Diesel engines give further value to these ships because they will still be usable and economical in new vessels, after the seaworthiness of the old hulls has been impaired by hard service.

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the construction of a passenger ship to replace the steamer Bienville which was burned at New Orleans shortly after her commissioning. Up to the present time, however, the officials of the company have not come to a definite conclusion as to the building of such a ship.

* * *

Contract was signed the end of November for the construction by Al Larson, Los Angeles Harbor, of a wooden deep-sea fishing boat for a Japanese syndicate. She has been designed by Mr. Larson, who has eased her bilge lines somewhat from the former type. This will give the vessel more stiffness and tend to reduce freeboard aft, a feature demanded in this type of craft. The new vessel will be 86 feet in length, 19 feet beam and 9 feet deep. She will be powered by a Western-Enterprise diesel of 185 horsepower, which will give her a sea speed of 10 to 11 knots. A feature of the hull is the cork insulation lining, which prevents too much loss of cold from the ice packing. The compartments designed to hold the fish are all cork lined to a thickness of 2 inches with galvanized iron covering and with soldered seams, making an air-tight space in which the fish can be kept cool and sweet during transportation to market.

As a compliment to the power plant builders this vessel is to be named Western-Enterprise. The operator has several other craft powered by the same type engine.

* * *

Kruse & Banks Shipyard, North Bend, Coos Bay, Oregon, has a contract for a 100-foot diesel engined cruiser for the Alaska Fish Commission to be used as a scout boat with quarters for eight men.

* * *

Moore Dry Dock Company, Oakland is constructing a steel car float for the Santa Fe Railroad 260 feet long, 38 feet beam, and 12 feet 6 inches depth. It will have three tracks and accommodate fifteen freight cars.

This steel car float is an experiment for San Francisco Bay and is the first one to be used by the Santa Fe; and the railroad company is expecting that the steel car float will considerably reduce operation costs due to the fact that the wooden car barges are inclined to sag and consequently require more towing power.

* * *

The Lake Washington Shipyards, Houghton, Washington, will build a 56-foot motor cruiser for Frank Manz of Seattle. The plans were prepared by naval architect John Winslow. The cruiser will be powered with a 100-horsepower Hall-Scott engine with triple reduction gears and will cost about $17,000.

* * *

The Shaver Transportation Company, Portland, Oregon has announced that it will convert its stern-wheel steamer Shaver to a diesel tug. Two Atlas-Imperial engines of 375 horsepower each will be installed.

* * *

The Marine Construction Company of Seattle recently completed a wood and iron car float for the Chicago, Milwaukee & St. Paul Railway for service on Puget Sound. The barge is 210 feet long, 43 feet beam, 12 feet depth, and will carry 12 cars on three tracks.

* * *

News is received from Vancouver, British Columbia, of the establishment of a diesel engine manufacturing plant at that city. Sydney Asser is president of the Company, and it is reported that work on the first unit of the factory will commence immediately.

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Keel Laying

Willets Point, diesel-electric hopper dredge for U. S. Army Engineers by Federal Shipbuilding & Drydock Co., Dec. 16.

Halcyon, ferryboat for Walkerville & Detroit Ferry Co. by Great Lakes Engineering Works, Dec. 12.

Car ferry for Wabash R.R. by Manitowoc Shipbuilding Corp., Nov. 30.

Deck barge by Nashville Bridge Co., Dec. 19.

Five dump scows for American Dredging Co. by Wm. Cramp & Sons Ship & Eng. Building Co., Dec. 7, 8, 23.

Three wooden yachts for Geo. M. Kelley, T. B. Van Dorn, and Hacker & Ferman, by Defoe Boat & Motor Works, Jan. 1.

Ferryboat for Philadelphia & Redding R.R. by Bethlehem Shipbuilding Corp. Wilmington, Del., Dec. 15.

Launchings

Dredge hull for Ellicott Machine Corp. by Bethlehem Shipbuilding Corp., Baltimore, Dec. 23.

Sternwheel towboat for The Ohio River Co. by Charles Ward Engineering Works, Dec. 21.

Deliveries

Montgomery, snagboat for U. S. Engineers by Charleston Dry Dock & Machinery Co., Dec. 1.

Kilmarnock, steel tug for Canadian Dredging Co. by Midland Shipbuilding Co., Dec. 16.

Kosmortar, towboat for Kosmos Portland Cement Co. by Nashville Bridge Co., Dec. 24.

Coamo, combination steamer for New York and Porto Rico Steamship Co. by Newport News Shipbuilding & Drydock Co. Dec. 22.

Frank A .Cunningham, ferryboat for City of New York by Staten Island Shipbuilding Co., Dec. 10.

Repair Awards

The Panama-Pacific liner Mongolia had her annual drydocking and painting at the Hunter's Point plant of the Bethlehem Shipbuilding Corporation, San Francisco. Due to the more favorable climatic conditions on this Coast than on the East and the accessibility of suitable drydock, the International Merchantile Marine Company decided to have the Mongolia, Manchuria, and Finland docked at San Francisco this season.

* * *

Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, has been awarded contracts for reconditioning two Lake-type steamers purchased by the Munson Line and C. D. Mallory Company of New York. These were the Lake Ellesbury and Lake Hester, which were part of the Shipping Board's idle fleet.

* * *

The famous Pacific Coast survey cutter Patterson is being transformed into a three-masted schooner with 350 horsepower diesel engines at Todd Dry Docks, Inc., Seattle. The vessel will be used by the Northern Whaling & Trading Co. of Seattle and Alaska.

* * *

A contract has been awarded the Robins Drydock Co., New York, by the American-Hawaiian Steamship Company for conversion of the steamer Nebraskan to an oil burner. Todd-White oil burners will be installed in the vessel.

* * *

The Albina Marine Iron Works, Portland, on a bid of $9895 was awarded contract for the installation of deep oil tanks in the Shipping Board steamer West Kader. The tanks are for carrying vegetable oils from the Orient.

* * *

The Shipping Board received the following bids for the reconditioning of the steamer West Kassan, recently damaged by fire on the Gulf Coast; Johnson Iron Works, New Orleans, $52,632; Jahncke Dry Dock Company, $60,783; Alabama Shipyard, Mobile, $61,693; Todd Shipyards, $69,929; and Galveston Drydock Co., Galveston, $85,978.

* * *

Bids have been opened for installation of passenger accommodations and general reconditioning on the steamship Munplace, of the Munson Line. The contract will involve about $100,000. Award is pending.

Hough & Egbert
Incorporated
519 Robert Dollar Building
San Francisco

Marine Surveyors
Consulting Engineers
Plans—Specifications
Supervision—Surveys

Manufacturer's Agents
for
Marine Specialties

Representing:
Bureau Veritas Int. Register of Shipping
Hough Patent Boiler Feed Checks
Walter Kidde & Co., Inc., New York
Rich Smoke Detection System
Lux Fire Extinguishing System
The Sumner K. Prescott Company
Prescott Tractors
Robt. H. Laverie, Inc.
Inspection Bureau
Material Testing & Inspection

Alexander
GOW, INC.
MARINE SURVEYORS
and
CONSULTING ENGINEERS
405 CENTRAL BLDG.
SEATTLE
TEL. MAIN 0520
Surveyors to Bureau Veritas Int. Register

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero, Works

Purchasing Agent: O. W. Streett.

General, hull 5327, diesel-electric tank barge for General Petroleum Corp.; 170 L.B.P.; 32 beam; 11-6 loaded draft; 9 mi. loaded speed: 920 D.W.T. 2 Atlas-Imperial diesel engs., 250 B. H. P. ea; keel Aug. 24/25; launched Oct. 28/25; deliver Jan 14/26, est.

No name, diesel-electric self-propelled barge for Richfield Oil Co., 180′ 6″ L.B.P.; 32′ molded beam; 12′ molded draft. Atlas-Imperial diesel engs.; Westinghouse motors; capacity 7000 gals. oil.

San Pedro Works

No name,, oil barge, for Richfield Oil Co.; 131 L.B.P.: 40 molded beam; 11′ 6″ molded draft; capacity 7000 gals oil.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

No name, hull 47, cannery tender for P. E. Harris & Co., Seattle; 85 long x 18 6 draft x 10 depth; keel Nov. 9/25.

Hull 48, gravel dump scow for State Gravel Co.; 80 x 90 x 9 feet.

Hull 49, fish carrier boat for P. E. Harris & Co.; 36 ft. long; keel Nov. 16/25.

LAKE WASHINGTON SHIPYARDS

Kirkland, Wash.

Purchasing Agent: A. R. Van Sant.

No name, purse seiner, for stock, 65 L.B.P.; 15 beam; 8 loaded draft; engs. not determined; keel Oct. 28/25.

No name, purse seiner, same as above; keel Oct. 28/25.

No name, purse seiner, same as above; keel Oct. 28/25.

Cruiser for stock, 39 L.B.P.; 8-6 beam; keel Oct. 25/25.

NAVY YARD

Puget Sound

Holland, sumbarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng. 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21 deliver April1/26, est.

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, moor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Twelve barges, T. C. I. & Ry. Co., 140x25x9; deliver Jan/26, est.

One fueling scow for Ohio River Co., 90x26x8 feet.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

No name, hull 304, diesel tanker; 480 ft. long; 9500 gro tons; 13,000 DWT; New York-Werkspoor engs. 3200 BHP, keel May 25; launch spring 1926, est.

Hull 312, dredge hull, 140 ft long, for Bneyons Co.; keel Sept/25.

Hull No. 313, dredge hull for American Dredging Co., 135 long; keel Sept /25.

Hull 314, suction dredge for U.S. Engineers; 130′ long, keel Feb/26 est.

THE AMERICAN SHIPBUILDING COMPANY

Cleveland, Ohio

W. H. Gerhauser, vice-president and director of purchases.

No name, hull, 791, bulk freighter, Pickands, Mather & Co., 580 L.B.P.; 60 beam; 20 loaded draft; 13 mi speed; 12,000 D.W.T.; 2200 IHP., trip. exp. engs.; 3 B, & W. boilers; keel Oct10/25, est

No name, hull 792, sister to above; keel Nov 10/25, est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT

Quincy, Mass.

Lexington, hull 1300, airplane-carrier U.S.N., launched Oct 3/25

No name, hull 1398, ferryboat for City of Boston, 172 L.B.P.; 40-8 beam; 10-4½ draft; 2 Comp. engs. 860 I.H.P.; 2 Scotch boilers; 10′ dia. 13′ long.

No name, hull 1399, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD., BALTIMORE DRY DOCKS WORKS

Baltimore, Md.

Hull 6132, dredge hull, Ellicott Machine Corp., 160 feet long; 40 feet wide; keel Oct. 17/25; launched Dec. 23/25.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT

Wilmington, Del.

No name, hull 3500, fireboat for the City of Houston, Texas; 117-6 LBP; 27 beam; 8-6 loaded draft; twin screw; diesel-electric drive; 14 mi speed; two 500 HP Winton 4-cycle diesel engs; Westinghouse generators; keel Oct. 5/25.

No name, hull 3501, ferryboat, for Philadelphia & Reading R.R.Co.; 198 L.B.P.; 35 beam; 10 draft; comp. engs. 1100 I.H.P.; 2 Scotch boilers, 11x21 ft.; keel Dec. 2/25.

No name, hull 3502, sister to above; keel Dec. 15/25.

CHARLESTON DRY DOCK & MACHINERY COMPANY

Charleston, S. C.

Purchasing Agent: Charles R. Valk.

Freighter for Daytona, Fla.; 22 beam, 4 draft; 8 knots, 60 I.H.P. diesel engs.

Lighter for Daytona, Fla.

Snagboat for U. S. Army Engineers, Montgomery, Ala; deliver Feb./26 est.

Lighter for Sanford & Brooks.

Name, hull 11, diesel double-ended drive ferryboat for Cooper River Ferry Commission, Charleston, S.C.: 120 L.B.P.; 35 beam; 6′ 6″ draft, 8 knots speed; 360 I.H.P. diesel engs.; keel Jan. 20/26 est.

CONSOLIDATED SHIPBUILDING CORPORATION

Morris Heights, N. Y.

Hull 2780, steel cruiser, W. O. Briggs; 118x21; 2 180-HP Winton diesel engs.

Hull 2796, cruiser for C. W. Sellick, 50 ft long; Liberty engs.

Hull 2797, cruiser for R. F. Hoyt, 81 ft long; 2 Wright & Typhone engs, 500 HP each.

Hull 2798, cruiser for H. C. Stutz, 65 ft long; 2 180-HP Speedways.

Hull 2799, cruiser for Elliott & Co., 44 ft long; 180-HP Speedway.

Hull No. 2800, cruiser for J. S. Caldwell, 68 ft long; 2 150-HP Speedways.

Hull 2801, cruiser for L. P. Fisher, 70 ft long; 2 300-HP Speedways.

Hull 2803, cruiser for G. M. Brown, 92 ft long; 2 300-HP Speedways.

Hull 2807, steel cruiser for Carl Fisher, 150 ft long.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO.

Philadelphia, Pa.

Purchasing Agent: Ed. C. Geehr.

Malolo, hull 509, express psgr and frt liner, Matson Navigation Co.; 582 LOA; 577 length at water line; 83 ft beam; depth molded to C deck 54 ft; displacement 22,050 tons; 8250 DWT; speed 22 knots regular, 23 knots maximum; 25,000 shaft horsepower; Cramp-Parsons turbines; oil burning B&W water-tube boilers; keel May4/25.

No name, hull 518, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55-6 beam; 29-6 molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears, six single-ended Scotch boilers; keel Feb. 10/26, est.

Hulls 519-523 inc., 5 steel dump scows for American Dredging Co.; 550 cu. yds. capacity; 112 length, molded; 34 beam; 12 depth molded; keels Dec. 7, 8, 23/25.

DEFOE BOAT & MOTOR WORKS

Bay City, Mich.

Purchasing Agent: G. O. Williams.

Hull No. 85, steel vessel U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 210 DWT; 300 IHP, diesel engs.; keel April/25; launch Apr. 11/26 est.: deliver Apr. 15/26 est.

Hull No. 86, sister to above; keel Apr10/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 87, sister to above; keel Apr18/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hul No. 88, sister to above; keel May5/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 89, sister to above; keel June15/25; launch April 11/26, est; deliver Apr. 15/26, est.

Hull 90, steel patrol boat for U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 12 mi speed; 210 DWT; 300 IHP diesel engs; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 91; sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 92, sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Sylvia, hull 93, steel yacht, Logan G. Thomson; 133 LBP; 21-6 beam; 7-6 loaded draft; 14 mi speed; 600 IHP twin Bessmer diesel engs.; keel Nov. 15/25; launch May 1/26 est.; deliver May 15/26 est.

No name, hull 94, wooden yacht for Geo. M. Kelley, Detroit; 55 LB.P.; 13 beam; 3-9 draft; 13 mi. speed; 13 D.W.T.; 140 I.H.P. gas engs.; keel Jan. 1/26; launch May 1/26, est.; deliver May 15/26, est.

No name, hull 95, wooden yacht for T. B. Van Dorn, Cleveland, same as above; keel Jan. 1/26; launch May 1/26, est.; deliver May 15/26, est.

No name, hull 96, wooden yacht for Hacker & Ferman, Detroit; same as above; keel Jan. 1/26; launch May 1/26, est; deliver May 15/26, est.

No name, hull 111, wood yacht, for I. M. Kirlin of Detroit; 55 L.B.P.; 13 beam; 3′ 9″ draft; 13 mi. speed; 13 D.W.T.; 140 H.P. gas engs.; keel Jan. 15/26 est.; launch May 1/26 est.; deliver June 1/26 est.

No name, hull 112, wood yacht for Alex McLeod of Detroit, same as above; keel Jan. 15/26 est.; launch May 1/26 est.; deliver June 15/26 est.

No name, hull 118, wood yacht for John J. Barlum of Detroit; 65 LBP; 12′ 6″ beam; 3′ 6″ draft; 28 mi. speed; 15 D.W.T.; 600 H.P. gas engs.

DRAVO CONTRACTING COMPANY

Pittsburgh, Pa.

Hulls 447-452 inc., 6 steel fuel barges for U. S. Engineers, St. Louis, Mo., 152 x34x6; 300 gro tons each.

Wakerobin, hull 453, lighthouse tender for Bureau of Lighthouses, 153-6 long, 43 beam; 6-6 depth; 900 gro. tons.

Hull 454, 1 sand digger for Keystone Sand & Supply Co., Pittsburgh, 153-6x43x6-6; 900 gro. tons.

Hulls 455-456, 2 steel oil barges, 90x23-6x9; for Atlantic Gulf & Refining Co.; 177 gro. tons ea.

Hulls 457 and 458, 2 sand and gravel barges for Missouri Portland Cement Co.; 130x30x7-6; 280 gro. tons each.

Hulls 459-464 inc.; 6 steel barges for stock; 100x26x6-6; 135 gro. tons ea.

Hulls 465-476 inc., 12 steel barges for stock; 100x26x6′6″; 135 gro. tons ea.

Hulls 477-486 inc., 10 steel barges for Equitable Towing & Trans. Co.; 140x26x9 ft.; 230 gro. tons ea.

Hulls 487-492 inc., 6 steel barges for stock; 130x30x7′ 6″; 830 gro. tons ea.

Hulls 493-502 inc., 10 steel barges for stock; 230 x45x11 ft.; 650. gro tons ea.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent: R. S. Page.

Steel Chemist, hull 83, freighter, U. S. Steel Corp.; 250 LBP; 42 ft 9 in beam; 20 loaded draft; 2100 DWT; Worthington engs. 950 SHP; keel Sept. 15/25.

Steel Electrician, hull 84, diesel-electric freighter, U. S. Steel Corp.; 250 LBP; 42-9 beam; 20 loaded draft; 2100 DWT; 750 BHP Nelseco engs; keel Sept. 24/25.

Willets Point, hull 85, seagoing, diesel-electric hopper dredge for U. S. Army Engineers; 193 ft LBP; 41 beam; 19 ft 6 in depth molded; two Winton diesel engines; keel Dec. 16/25.

GREAT LAKES ENGINEERING WORKS

River Rouge, Mich.

Purchasing Agent: Chas. Short.

Halcyon, hull 252, automobile and passenger ferry for Walkerville & Detroit Ferry Co., 128 L. B. P.; 45 beam; 12 loaded draft; 12 mi. speed; 900 I.H.P. F. & A. comp. engs.; 2 Scotch boilers 11 ft 6 in; keel Dec. 12/25; deliver Mar 1/26, est.

HOWARD SHIPYARDS & DOCK COMPANY

Jeffersonville, Ind.

Purchasing Agent: Jas. E. Howard, President.

Gouverneur, hull 1583, diesel-electric towboat for U.S. Engineers, St. Louis, 100 LBP; 23 beam; 4 draft; 2 150-H.P. diesel engs.; keel Nov. 1/25.

No name, hull 1586, steam ferry, catamaran type, for Baton Rouge Trans. Co.; 150 LBP; 50 deck beam, 18 hull beam; 5 loaded draft; high pressure steam engs.; 500 I.H.P.; 2 firetube boilers 44″ x22′.

No name, hull 1587, maneuver hull for Vicksburgh Engineers; 60x26x6ft.

No name, hull 1588, concrete mixer hull for Vicksburgh Engineers; 128x42x7 ft.

No name, hull 1589, diesel ferry for Tri-State Ferry Co., Cairo, Ill.; 100x30x5 ft.; 200 I.H.P. diesel engs.

No name, hull 1590, diesel-electric side-wheel excursion boat for stock; 250x40x7 ft.; 15 mi. speed; 2400 HP diesel engs.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wis.

Purchasing Agent: H. Meyer.

No name, hull 222, double-end car ferry, Wabash Railroad; 370 L. O. A.; 65 beam, 21 ft 6 in depth; two screws at each end; 4 comp. engs. of 1000 HP each; 6 Scotch marine boilers; keel Nov. 30/25; deliver spring 1926, est.

MARIETTA MANUFACTURING CO.

Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Hulls 145-150, inc., six barges for Indiana-Belfort Transportation Co.; 150 long; 36 beam; 10 draft; keels Aug. 15/25; 3 delivered.

Belfont, hull 151, diesel stern-wheel, for Indiana-Belfont Transportation Co.; 100 long, 24 beam; 4-4 draft; 360 HP Fairbanks-Morse diesel engs.; keel Oct. 25/25; deliver Mar. 1/26, est.

MIDLAND BARGE COMPANY
Midland, Pa.

Purchasing Agent: H. S. Neal.

Contract 1042, 1 steel wharfboat for City of Baton Rouge, La.; 230 ft x 40 ft x 12 ft; deliver Dec/25, est.

Contract 1043, 1 steel barge, for U. S. Engineers, Montgomery, Ala.; 80 ft x 26 ft x 5 ft; deliver Nov/25, est.

Contract 1045, dredge for Alleghany River Sand Co., Pittsburgh.

Contract 1046, derrick boat for Alleghany River Sand Co., Pittsburgh.

Contract 1047, hopper float, E. T. Slider, New Albany, Ind.

Contract 1048, 3 hopper barges for Crusible Fuel Co.

Contract 1050, 6 hopper barges for Alleghany River Sand Corp.

Contract 1052, 12 steel deck flat scows, 75'x25' x5' 6"; for Sate of New York, dept. of public works, Bureau of Canals.

Contract 1051, 2 steel wharf boats with steel cabins for Baton Rouge Trans. Co.; 110'x30'x6'.

MIDLAND SHIPBUILDING COMPANY, LTD.
Midland, Ontario

Purchasing Agent: R. S. McLaughlin.

Glenmohr, hull 16, single deck freighter for Great Lakes Transportation Co., Ltd., Midland, Ontario; 633 L. O. A.; 70 beam; 29 depth; 11 knots speed; 18 ft. loaded draft; 15,000 D.W.T.; TE engs. 3000 HP; keel Nov. 18/25; launch Jan. 14/26, est.

NASHVILLE BRIDGE COMPANY
Nashville, Tenn.

Purchasing Agent: Leo E. Wege.

Nashville B., hull 92, diesel towboat, builders' account; 110 LBP; 28 beam; 5 loaded draft 400 IHP diesel engs.; keel May 1/25; launched Oct. 27/25.

Burnett, hull 94; diesel-electric towboat, U. S. Engineers; 70 LBP; 17 beam; 4 draft; 150 HP eng.; keel Oct. 10/25; launch Feb. /26, est.

Gillett, hull 95, same as above; keel Oct. 15/25; launch March /26, est.

Kosmortar, hull 97, towboat, twin screw; 75 LBP; 19 beam; 4½ loaded draft; 240 BHP diesel engs.; keel Oct. 10/25; launched Dec. 4/25; **delivered Dec. 24/25.**

Kings-Landing, hull 98; sister to above; keel Oct. 10/25; launch Jan /26, est.

Hull 99, deck barge; 142x32x9; keel Oct1/25; launch Nov20/25, est.

Hull 101, deck barge, 100x24x5; **keel Dec. 19/25,** launch and deliver Feb. 15/26, est.

Hull 102, deck barge, 100x24x5; keel Feb15/26, est; launch and deliver Mar 15/26, est.

Hull 103, deck barge, 142x32x9; keel Jan. 15/26, est; launch and deliver March 1/26, est.

Hull 104, dredge hull, 75x24x5 ft.; keel Feb. 15/26, est.; deliver Mar. 1/26, est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas: Plummer, 233 Broadway New York City.

Mohawk, hull 287, combination steamer, Clyde S. S. Co., 387 ft 6 in LBP; 54 ft beam; 31 ft 6 in draft; 14½ loaded speed; 2600 DWT; Newport News-Curtis turbines, 4200 SHP; 4 Scotch boilers; keel Apr. 1/25; launched Oct. 21/25; deliver Jan. /26, est.

Chatham, hull 288, combination passenger and freight steamer, Merchants & Miners Transportion Co., Baltimore, Md.; 350 length; 52 beam; 36 depth; 13½ mi speed; TE eng; 4 Scotch oil-fired boilers; keel July30/25; launch Feb/26, est; deliver May1/26, est.

Dorchester, hull 289, sister to above; keel Sept 10/25; launch Mar. 26, est.

Fairfax, hull 290, sister to above; keel Nov. 12/25.

Hull 292, diesel-electric 20-in pipe line suction dredge, U. S. Engineers, Philadelphia; 230 ft long; 40 ft beam; 14 ft depth; McIntosh & Seymour diesel engs.; keel Nov. 19/25; launch Mar/26, est.

Pawnee, hull 293, yacht for Hany Payne Bingham; diesel eng.; keel Sept. 21/25, launched Nov. 12/25.

Savarona, hull 303, diesel yacht, 2 screws for R. M. Cadwalader; 174 L.O.A.; 27 beam; 15 ft. 8 in. depth; Winton engs.; keel Jan /26, est.

Arcadia, hull 304, diesel yacht, 2 screw, for Galen L. Stone; 177 L.O.A.; 27 ft 6 in beam; 15 ft 8 in depth; Winton engs.; keel Mar/26, est.

Josephine, hull 305, diesel yacht, 2 screw, for E. S. Burke, Jr., 132 L.O.A.; 24 beam; 13 ft 1 in. depth; Winton engs.; keel May/26,est.

No name, hull 306, passenger and freight steamship for Clyde Steamship Company, New York, 407'-3" overall, 62'-0" beam, 30'-6" depth, Newport News turbines and gear; 8500 I.H.P.; Scocth boilers; oil burning; keel March/26, est.

No name, hull 307, sister to above; keel Apr./26, est.

Aras, hull 308, diesel engine yacht, for Hugh J. Chisholm; 162'-0" long, 26'-0" beam, 14'-6" depth; Winton diesel engs.; keel Jan./26 est.

Hulls 309-311, inc., three house barges, for Chesapeake & Ohio Railway; 100'-0" long, 30'-0" beam, 8'-6" depth, keels Pan./26, est.

Hull 312, one carfloat, for Chesapeake & Ohio Railway, 256-0" long, 36'-0" beam, 10'-0" depth; keels Jan./26, est.

No name, hull 313, tugboat hull, for the Pennsylvania Railroad, 80'-0" long, 19'-0" beam, 12'-6" depth; keel Jan./26, est.

No name, hull 314, sister to above; keel Jan./26, est.

No name, hull 315, 18-knot, passenger liner for Panama Pacific Line, New York; 600 ft. long, 80 ft. beam, 52 ft. depth; watertube boilers for oil 22,000 gross tons; 17,000 I.H.P.; keel May/26, est.

Robador, hull 316, diesel engine yacht, for Robert Law, Jr., 160'-6" long, 26'-0" beam, 14'-9" depth.

No name, hull 317, passenger and freight steamship for Clyde Steamship Co., New York, 402'-0" overall, 55"-0" beam, 31'-6" depth; Newport News turbines and gears; Scotch boilers for oil burning.

THE PUSEY & JONES CO.
Wilmington, Del.

Purchasing Agent: James Bradford.

No name, hull 1030, single screw passenger and freight steamer for Baltimore & Philadelphia Steamboat Co., Philadelphia; 219 L.B.P.; 45 beam; 11 loaded draft; 14½ mi speed; 4 crank, TE engs. 21-32-35-35 by 24"; two B. & W. water-tube boilers, 3046 sq. ft. heating surface each; keel Nov. 11/25; launch Mar. 10/26, est, deliver July 1/26, est.

No name, hull 1031, sister to above.

Siele, hull 1032, twin screw diesel yacht for John H. French, Detroit; 124 L.O.A.; 20-6 beam; 6-10 draft; 2 300 HP Winton diesel engs.; keel Dec. 1/25; launch Apr. 1/26, est.; deliver June 1/26, est.

STATEN ISLAND SHIPBUILDING COMPANY
Staten Island, N. Y.

Purchasing agent: R. C. Miller.

Frank A. Cunningham, hull 758, ferryboat City of New York; 151 ft. long; keel Mar. 27/25; launched Nov. 24/25; **delivered Dec. 10/25.**

American Legion, hull 764, ferryboat for City of New York, 264 L.O.A.; 66 beam over-all, 47 beam mld.; 14 loaded draft; 15 mi. speed; abt. 2600 gro. tons; 2 comp. engines, 3500 I.H.P.; 4 W. T. boilers.

No name, hull 765 tugboat hull for New York Cenral R.R.; 96'x26'x10'-3"; 12 knots speed; 200 gr. tons; 650 I.H.P. diesel-electric prop. unit; deliver July/26, est.

No name, hull 766, tugboat sister to above.

SUN SHIPBUILDING COMPANY
Chester, Penn.

Purchasing Agent: H. W. Scott.

Hull 85, carfloat. Pennsylvania Railroad; 358 LBP; 47 ft 4 in beam; 12 ft 6 in depth; keel July 29/25; launch Dec. 24/25, est.

Hull 86, sister to above; keel Aug1/25; launch Dec16/25, est; deliver Jan9/26, est.

Hull 87, carfloat, Pennsylvania R. R.; 250 LBP; 34 beam; 9 deph; keel July 27/25, launched Nov. 10/25.

Hull 88, sister to above, keel Aug. 3/25; launched Nov. 27/25.

Hull 91, carfloat, Pennsylvania R. R.; 230 LBP; 38 beam; 10 ft6 in depth; keel Aug31/25; launch Dec 10/25, est.

Hull 92, carfloat, sister to above; keel Sept7/25; launch Dec10/25, est.

Wicomico, Hull No. 93, tug, for Pennsylvania R. R.; 116x24x13-8; keel Sept. 14/25; deliver Dec. 26/25, est.

Hull 95, barge for Sun Oil Co., 100x19x9, 50,000 gals. cap.; 100 B.H.P. engs.

Hull 96, barge for Sun Oil Co. 158-x24-4-x11-3, 150,000 gals. cap; 150 B.H.P.

Hull 97, barge for Sun Oil Co., 260x40x15; 750 BHP. engs.

TODD ENGINEERING, DRYDOCK & REPAIR CORP.
Brooklyn, N. Y.

John H. McCooly, hull No. 36, ferryboat, City of N. Y., 148 L.B.P.; 53 beam; 9-9 load draft; keel Feb15/25. launch June 14/25.

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

No name, hull 38, sternwheel towboat, The Ohio River Co.; 145 LBP; 32 beam; 5 draft; recip 700 IHP. engs.; return tubular boilers, 42 in. x 26 ft.

No name, hull 39; steel barge, Kelly Axe & Tool Co.; 150 long, 26 beam; 8 deep; keel Oct. 13/25; **launched Dec. 21/25**; deliver Jan. 13/26, est.

No name, hull, 40, sister to above; keel Oct. 26/26; deliver Jan. 13/26, est.

No name, hull 41, sister to above; keel Nov. 24/25; deliver Jan. 13/26, est.

No name, hull 42, sister to above.

No name, hull 43, sister to above.

No name, hull 44, sister to above.

No name, hull 45, sister to above.

No name, hull 46, sister to above.

No name, hull 47, sister to above.

Repairs

BETHELEM SHIPBUILDING & DRYDOCK CORP., SAN FRANCISCO.
Potrero Works

Complete conversion from steamer to motorship; Tanker Lio. Drydock, clean, paint, misc. repairs: El Segundo, R. K. Kingsbury, Robert Johnson, President Polk, W. S. Rheem, Cuyama, West Camargo, H. T. Harper, Capt. A. F. Lucas, Tascalusa, Lebec, West Jappa, Missourian, Georgian, West Nilus, Kermit. Drydock, engine, boiler, hull repairs: Manukai, Chihuahua, Washtenaw. Engine, boiler hull repairs: Kathlamba, Noorderjik, Atlantic, Guerrero, Comliebank, Suremico, Willaston, Belgenland, Lena Luckenbach, J. S. Luckenbach, Suportco, Sea Ranger, Makura, Dorothy Luckenbach, Cascade. Propeller repairs: Katherine Donovan, Storey. Installed Howden tube sheet: Minnesotan. Telemotor repairs: Wm. E. Hutton. Retube main condenser: President Pierce. Misc.: Daisy Putman, Daisy Matthews, Daisy Dadsby, Daisy, Daisy Gray, Monongahela, Bandon, Quinault, Katherine, Virginian, San Pedro, Montanan, W. R. Chamberlin, Jr., Finland, Frank G. Drum, Hegira, Makena, Cathwood, Robin Hood, H. W. Baxter, Hanley, Maunalei, Matsonia, Iowan, Smith-Rice Barge, Independence, Noyo, Napa Valley, Texan, Rose City, Tosca, Paul Luckenbach, Dungannon, Shabonee, S. C. T. Dodd, Panaman, Manchuria, Charlie Watson, H. T. Harper, Dorothy Luckenbach, San Pedro, Dakotan, Iowan.

San Pedro Works

Drydock and repairs: Stmrs. Liebre, San Patriocio, yacht Invader. Misc. repairs: Strms. San Fernando, Deroche, Utacarbon, Newport, Hamlin F. McCormick, Agwimex, Missourian, Chuky, India Arrow, Cathwood, Mojave, Yale, Halo, Emedio, Agwilake, Nassa, Inverleigh, Wm. A. McKinney, Alvarado, Homer, Niels Nielsen, Agwisea, Tamalpais, m.s. Los Alamos, stm. schr. Edna, Trinidad, dredges McMillan, Frank Lynch, San Francisco, tug San Pedro, launch Canadohta, barge Ricco No. 1.

CHARLESTON DRY DOCK & MACHINERY CO.,
Charleston, S.C.

Plates removed and faired: Schoharie. Dock, clean, paint: bark Derwenst. Damages repairs: sch. Lovat.

COLLINGWOOD SHIPBUILDING CO.,
Collingwood, Ontario.

New tail shaft and propeller: Hamonic. Bottom, bow, and side damage repairs: stmrs. Frank B. Baird, Judge Hart, Belvoir. Add 95 feet to length: stmr. Glenross.

LOS ANGELES SHIPBUILDING & DRYDOCK CORP.,
San Pedro, Calif.

Clean, paint: stmr. San Pedro, barge 1922. Clean, paint, misc. repairs; stmrs. Sierra, Catalina, West Chopaka, Despatch V., yacht Almo, lighter No. 6.

PRINCE RUPERT DRY DOCK & SHIPYARD,
Prince Rupert, B.C.

Renew stern tube: Prince Charles. Convert from coal to oil burning: stmr. Canadian Farmer. Misc. hull and machinery overhaul: 14 fishing vessels.

W. F. STONE & SON,
Oakland, Calif.

Docked and extensive reconstruction of hull: m.s. Lark. Docked and installation of 125 HP Aalas-Imperial engine; reconstruction of deck and deck frame, deck and pilot houses: tug Alex. B. Remodel interior: yacht Zingara. Docked, painted: yacht Frevilla. Winter layup and overhaul: ten yachts.

NAVY YARD,
Bremerton, Wash.

Docked and misc. repairs: West Virginia, Omaha, Stoddert. Misc. repairs: Mississippi. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

VICTORIA MACHINERY DEPOT CO.,
Victoria, B.C.

Condenser repairs: stmr. Charmer. Dock, clean paint, misc. repairs: Madge, tug Red Fir (hull, boiler, engine). Damage repairs: Princess Royal. Make and fit new smoke stack, deck repairs, misc. damage repairs: Artemisia.

LIFE SAVERS

LIFE SAVERS.

Q. What is a life-saver?

A. An after-dinner mint shaped like a doughnut:

A beeg strong feller on the beach;
A quart of gas on the highway;
A cork jacket at sea;
A corkscrew ashore.

ANTEDELUVIAN.

Objects five thousand years old have been unearthed in the Euphrates Valley, according to a recent press dispatch.

That's nothing: this Life Savers column unearths over a dozen such every month.

PRO BONO PUBLICO.

Congress is ready to resume work, we see and they are announcing a six months session. Wonder what they've got up their sleeves? Must have lost some more oil or something.

The Bonus Bureau is nearing the end of its giant task—but the great American public, it seems, will never near the end of its task.

FLORIDIACS.

Some scientist has just discovered that the peculiar noise heard in certain sections of the country is nothing more nor less than the Florida boom.

Latest song-hit—"Oh, Miami, you owe a lot to me!"

An old acquaintance dropped in on me the other day and after saying the only difference between Miami and hell was that everything in hell was free—borrowed a V. and departed.

ENTOMOLOGICAL NOTE.

Fly To Wed on Yankee Ship.
—Headline in the Boston Post.

A WARM RECEPTION.

W. H. P. writes: "A batch of jokes I sent to the editors were rejected as no good, but when I threw them in the stove the fire just roared."

CARELESS!

Sailor: They've just dropped their anchor."

Mrs. Symp: Gracious, I was afraid they would! It's been dangling outside for some time."- Sea Bag (U.S.S. Oklahoma).

NO MONKEY BUSINESS.

Whate'er my forebears may have been,
Ape, insect, bird, flesh, fowl, or fin,
I am myself; and, rain or shine,
Intend to fill the place that's mine.
Say what you will, prove what you can
About the origin of man -
No line of monkey ancestry
Can make a monkey out of me.

John Kendrick Bangs.

ALPHABETICAL NOODLES.

Diner "Waiter, there's a button in my soup."

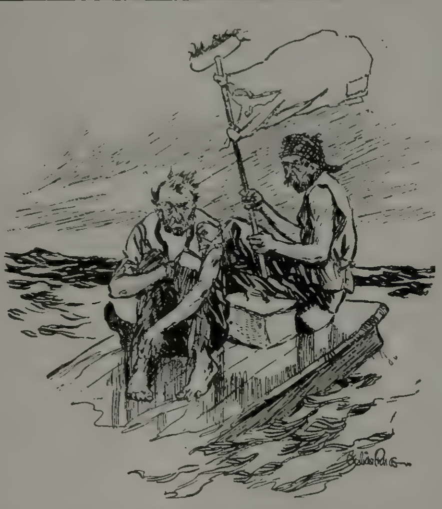
Waiter (ex-printer): "Typographical error, sir; it should be 'mutton.'" -The Progressive Grocer.

SO SAY WE ALL!

Some anonymous taxpayer has contributed the following definition of taxes:

"The process by which money is collected from the people to pay the salaries of the men who do the collecting.

"The surplus is used to pay the salaries of the men whom people elect to determine the amount to be collected from them."



First Shipwrecked Sailor (to second ditto): "I 'opes we gets picked up soon. Alf—I promised to sign on the *Saucy Sue* next trip out."

—*London Opinion.*

OLD STUFF

CAT HARPINS.

No, my dear friend, a cat harpin
Is not a hairpin for a cat.
No feline hirsute appenage,
No certainly it is not that.

It is a short and pointed yarn,
Wherewith ye crew ties up ye shroud,
And makes ye standing rigging snug,
So that ye yard it does not crowd.

Thus does ye cat harpin become
A saver of ye sailors' shins;
The value of his life aloft,
He often owes to cat harpins.

FULL SPEED AHEAD.

Old Bill Barnacle said: "Lots o' folks think that there's only one head to a ship, and that's the cap'n. But they're all wrong. Lots o' heads. Cat-head; knight-head; fo'castle-head; capstan-head; mast-head; bollard-head; rudder-head; bolt-head, and often a block-head."

WASTE ECONOMY.

Ole Olson had been working as an engine wiper, and his boss, a thrifty man, had been coaching him for promotion to fireman with such advice as:

"Now, Ole, don't waste a drop of oil —that costs money. And don't waste the waste, either—that's getting expensive, too."

When Ole went up to be questioned on his eligibility as a third assistant he was asked:

"Suppose you were on watch and a boiler exploded. What would you do?"

"I grab the oil can," replied Ole, "I grab the waste—and I yump overboard."

SLIGHTLY CROSS-EYED.

"We look with one eye upon the dove of peace if it arises on the distant horizon, but with the other eye we look through the concrete necessities of right." —Premier Mussolini, as quoted by the Associated Press.

WAS SHE A SHIPPING BOARD FREIGHTER?

We are awarding the Ignobel Prize for 1925 to the man that thought bicuspid was a double-decked spittoon.

REPARTEE.

In one of Lloyd George's early campaigns some one threw a brick through the window, and it fell on the platform at his feet. Picking it up, he nents." From the gallery, a sullen fellow kept calling out, "Rats! Rats!" in one of his meetings. "Will some one please take the Chinaman his dinner?" was the witty and effective reply. Once when he was talking on "Home Rule" he said, "I want home rule for England, for Scotland, for Wales, for Ireland." At this point some one shouted, "Home rule for hell." "That's right," he shot back, "Every man for his own country." In another gathering a man shouted, "Oh, you're not so much. Your dad used to peddle vegetables with a donkey and cart." "Yes," said the orator, "that is true. My father was a very poor man. The cart has long since disappeared, but I see the donkey is still with us."---Christian Register.

Personal Paragraphs and items of Interest

A Record for W. G. McGee and Pacific Coast Progress

WHEN the sales reports for 1925 from representatives throughout the world were compiled by the Plibrico Jointless Firebrick Company, we found that the leading territory is the San Francisco Bay, Central and Northern California district—right at the top-

Two and one-half million pounds of Plibrico were sold during the past year by W. G. McGee, president of the McGee Sales Agency, whose headquarters are 37 Spear Street, San Francisco. We are mighty proud to announce this leadership to the wide world, for it is more than a remarkable sales achievement by the genial Mr. McGee—it is another first-hand positive proof of the fertility and amazing development of the marine industry on the Pacific Coast. It is another emphatic bearing out of the statement about "Westward, the course of Empire."

W. G. McGee, President McGee Sales Agency, San Francisco, representative of the Plibrico Jointless Firebrick Company.

It is just two years ago that Mr. McGee assumed direction and management of the Plibrico Jointless Firebrick Company sales and service, and to have placed his territory at the world-wide sales pinnacle in that brief period of time is indeed a splendid demonstration of energy and ability. Mr. McGee's activity in the San Francisco Bay, Central and Northern California field has firmly established his product as meeting every condition in both marine and industrial use requiring refractory service.

Fifteen years' marine engineering experience has stood Mr. McGee well in hand. He has served as an engineer on all classes of vessels operating in every important world trade route. Another important period of practical engineering service was with the Moore Shipbuilding Company. Prior to joining the Plibrico organization Mr. McGee was with several marine engineering firms in an executive capacity.

His first "marine work" was during President Roosevelt's regime, when he was a member of the mechanical construction department building the Panama Canal. That was in 1907-1908, and we're glad to tell "Mac" that as a Canal Zone machinist he contributed an early and important share toward the upbuilding of the Pacific Coast. It is a fact that a healthy lot of that 2,500,000 pounds of Plibrico he sold in 1925 was installed in the great fleet of intercoastal carriers using "the Big Ditch" en route between Pacific Coast and Atlantic ports. True to form, Mr. McGee is a man of foresight and vision.

He started handling Plibrico refractory material on January 1st, 1924, and before the Xmas holidays had sold no less than 800,000 pounds. We predict that 1926 finds our territory right up at the front again.

Mr. McGee is attending the annual convention of Plibrico representatives in Chicago, January 26th and 29th, and from that meeting before returning home to San Francisco he is to take in the National Power Exposition. The Plibrico sales meeting will be a gathering of eighty-six representatives from the Western, Central, Pacific Coast, and Canadian territories. A group of foreign representatives also will be on deck, exchanging ideas and outlining the campaign for the ensuing year.

HANLON DRYDOCK & SHIPBUILDING CO.

Captain William Peterson has been appointed rigger and yard foreman at Hanlon Drydock and Shipbuilding Company, Oakland. Captain Peterson, though a young man, has been master of many vessels, having passed a lifetime at sea. Among his larger commands were the Rotarian, Lake Gunni, and motorship City of Portland. He has also been in command of coasters, and was executive officer on the U.S. dredge Chinook. Being well versed in ship gear and handling of heavy weights, Captain Peterson will be an advantage to the yard employing him.

J. R. CHRISTY ANSWERS CALL.

J. R. Christy, well known engineer and shipbuilder, died on January 4th, 1926, after a brief illness. Mr. Christy was a natice of California, and many years ago associated with the Dow Pump Co. Later he founded the United Engineering Works, with H. P. Gray. At this plant many engines and hulls were built, all being noted for good work. At the time of the late war the Alameda plant of the United was purchased by the Bethlehem Shipbuilding Corporation, and many of the Shipping Board vessels were built there, as were engines for other government ships, Mr. Christy being active manager of the plant at the time. For the past few years he has been engaged in private affairs, taking a rest from the arduous work he carried on during the war. A large number of old friends gathered at his funeral, strongly emphasizing the esteem in which he was held by his associates. Sterling honesty and a kindness of character made him well thought of by all.

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to
Coast

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The President Lincoln is one of several of the Dollar Steamship Line equipped with the Kolster Radio Compass

The Kolster Loop says "Protected!"

The square loop of the Kolster Radio Compass over the bridge is a sign of a "protected" ship.

Protected—at harbor entrances—at sea. Protected—despite the weather! With a Kolster Radio Compass, navigating officers can not only accurately establish the ship's position in the densest fog, but can also obtain a fix in fair weather when far outside of the sight of land.

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Send for Bulletin 25

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RADIO COMPASS

Personal Paragraphs and Items of Interest

(Continued from Page 13 Adv. Sec.)

McCormick Buys P-A-B Line

President Elmer Crowley of the Emergency Fleet Corporation has recommended to the United States Shipping Board the sale of the six freighters of the Pacific-Argentine-Brazil Line to the Charles R. McCormick Lumber Company of San Francisco, and on January 19 the sale was announced. The six vessels have previously been operated by Swayne & Hoyt, Inc. in the Pacific Coast to East Coast of South America trade. Only two companies bid on the fleet. Swayne & Hoyt, Inc., is reported to have bid approximately $46,000 per vessel and the McCormick organization bid approximately $49,000 each. It is understood that the McCormick Line agrees to operate the fleet in the same trade for a term of five years. The vessels involved in the sale are the West Camargo, West Cactus, West Notus, West Conob, West Gambo, and the Hollywood. Each is of 8600 deadweight tons. Pacific Marine Review plans to publish in an early issue an outline of the rapid and progressive development of the great fleet and lumbering operations under the McCormick flag.

James S. Milne Opens Office

Friends of James S. Milne on the Pacific Coast and throughout the maritime world will be glad to know of his opening offices at 1746 Whitehall Building, 17 Battery Place, New York City. Mr. Milne is conducting the general business of consulting engineer and surveyor. He is widely known and his career covered a remarkable scope of shipping experience since he left the American Line in 1896 and went to the Newport News Shipbuilding & Drydock Company as guarantee chief engineer. Among the famous organizations where Mr. Milne held important positions are the Todd Shipyard Corporation, where he held the post of chief engineer for nine years. In the conduct of his own offices he carries the good will of friends throughout world ports.

Prescott Iron Works

Sumner K. Prescott, president of The Sumner K. Prescott Company, announces a change in the corporate name of the firm, now effective. It is the Prescott Iron Works, in all other respects the same industry—engineers, machinists, and founders. The well-known Seattle plant are manufacturers of the Prescott dock tractors, in use by a score of active freight handling organizations.

Worthington Official Resigns

W. P. Eichbaum, for some thirty years associated with the Worthington Company at San Francisco as sales manager, has recently retired. His place will be filled by A. R. Thorson, who has also been connected with the firm for some time. During Mr. Eichbaum's administration great advances have been made in the company. He has made many friends, all of whom hope he will have pleasure in a rest from business cares. Mr. Thorson has for the past few years been closely identified with the fast growing branch of the diesel business of the Worthington Company.

Elaterite Paint Company

John J. Jones, for several years New York representative of the Morse Drydock & Repair Company of Brooklyn, recently resigned. Mr. Jones will become associated in an official capacity with the Elaterite Paint Company of New Brunswick, New Jersey. For the past twenty-seven years Mr. Jones has been an active figure in marine circles on the west and east coasts. He was formerly with the Bureau Veritas, Merchant Shipbuilding Company, and New York Shipbuilding Corporation before going with the Morse plant.

In addition to its properties at New Brunswick, the Elaterite Paint Company also has taken over the plant of the Raven Mining Company of Chicago and the United States Elaterite Company of Salt Lake City.

Henry F. Gelhaus, President for 1926

Henry F. Gelhaus, superintending engineer of Swayne & Hoyt, Inc., San Francisco, is president of the American Society of Marine Engineers for 1926. Mr. Gelhaus, while a comparatively young man, has had a wide experience as an engineer. He is a native of California and, like many other good marine engineers, served his time at the old Union Iron Works, now the Bethlehem. Pacific Marine Review predicts a good running watch for the Society with Mr. Gelhaus on the platform.

Trade Seeks New Areas

THE most significant development in shipping since the war, as disclosed by a survey made for the National Merchant Marine Conference, sponsored by the Chamber of Commerce of the United States, is due to the hunt for new trading zones.

Important as the old highways of the sea—such as the lanes between the United States aud Europe—are, ships striking out on newer paths to the far corners of the world away from the long established industrial and commercial centers.

"It is in the long haul trade to and from the relatively undeveloped trade regions, South America, Asia, and Africa," says the report, "that the most significant increase in shipping, and particularly shipping under the American flag, has taken place."

These are the trade building services, and there is widespread recognition on the part of exporters and importers of the fact that direct and regular services maintained on these routes, largely through Shipping Board tonnage, are having an important effect in increasing American foreign trade and broadening the market for our surplus agricultural and industrial products. Before the war a very small fraction of this trade was carried in American bottoms. Part of it was served by steamers under foreign flags, and a considerable part was not served at all by direct steamship services but only by round about routes, generally involving transshipment at foreign ports. The lack of direct services materially restricted the development of American foreign trade, leaving it to our competitors.

The S.S. "SIERRA" of the Oceanic Fleet is Federal equipped

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DAILY!
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Federal marine sets stand alone in performance. They are compact, occupy a minimum of space and the cost of maintenance is low. The service that follows their installation is worth investigating!

When will your vessels be FEDERAL equipped?

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Secure this dependable service and prompt transportation by arranging for your freight to be handled by United States Government Ships. Write for full details.

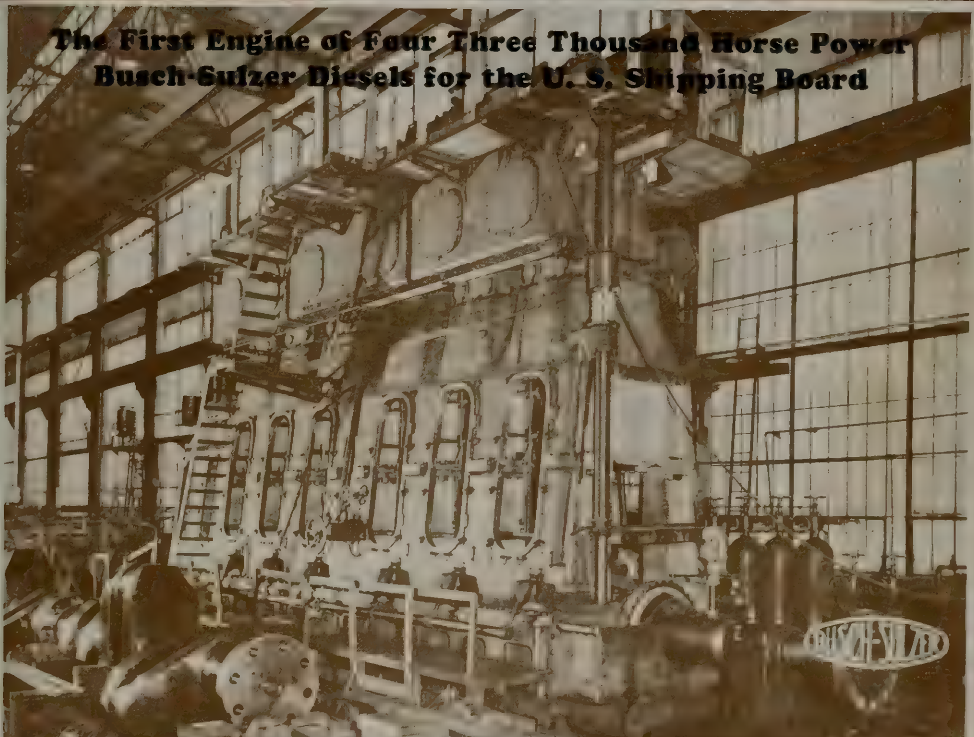
UNITED STATES SHIPPING BOARD

TRAFFIC DEPT. - WASHINGTON, D. C.

Pacific Marine Review

The National Magazine of Shipping

MARCH, 1926



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Single Acting, Two Cycle.
Directly connected Scavenger Pump and Compressor.
One mechanically operated valve in cylinder head.
Camshaft at cylinder head level—no push rods.
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PACIFIC AMERICAN

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LINDE OXYGEN

Pacific Marine Review

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The Aloha—and AMF Pumps

COMMODORE Arthur Curtis James' beautiful yacht "Aloha", (illustrated above) with her glorious spread of canvas, reminiscent of earlier days—is nevertheless the most modern and luxurious of modern pleasure-craft. She is now being reconditioned and converted from steam to Diesel Drive at the yards of the Staten Island Ship Building Co., under the direction of Tams & King, naval architects and is being AMF Pump equipped from stem to stern. Complete AMF Pump equipment includes the following system:

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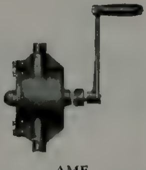

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MARCH 1926

Vol. XXIII. No. 3

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

James S. Hines,
President and Publisher.

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Vice-Pres. and Manager.

576 Sacramento Street, San Francisco
136 LIBERTY STREET, NEW YORK
Wm. Z. Gardner, Special Eastern Representative.

Member of Pacific Traffic Association

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1924, by J. S. Hines. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Official Organ
Shipowners' Association of the Pacific

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Shipping Legislation

PROSPECTS of the passage of any important shipping legislation during the present session of Congress become more remote as the debates on the new revenue measure and proposed amendment of the Volstead Act become more acrimonious and more embarrassing to the administration. Claims of the farmers for tariff relief and pressure of eastern consumers for action in the anthracite coal crisis have contributed to the perplexity of the White House, so that there is little prospect of any strong efforts being put forward in the interest of merchant marine relief measures.

At the same time there is some possibility of favorable action on the proposals for reorganization of the various government bureaus dealing with maritime affairs, including the Shipping Board and Emergency Fleet Corporation, provided this can be accomplished without destroying the present system of regional representation. Separation of the Shipping Board and Emergency Fleet Corporation is proposed in the bill drafted under the direction of the United States Chamber of Commerce and introduced in the House by Representative Robert L. Bacon of New York. The measure, which is in line with the findings of the national merchant marine conference held recently in Washington, is supplementary to the measure introduced by Representative Scott providing for consolidation in the Department of Commerce of various shipping functions now vested in the Treasury Department, establishing definite American load line regulations, and abolishing the office of Supervising Inspector General of the Steamboat Inspection Service.

The Bacon measure proposes that the Shipping Board shall shall turn over to the President all stock in the Emergency Fleet Corporation and that a Federal shipping council shall be created, the membership to include the Secretary of Commerce as chairman, the Secretaries of the Treasury, War, and Navy, the Postmaster General, the President of the Fleet Corporation, and seven others to be appointed by the President subject to confirmation by the Senate, these latter to be selected, one from each of several regional districts. In each of these districts there would be an advisory council to deal with shipping matters affecting their districts.

The Shipping Board would be replaced by a merchant marine commission of three members, which would assume all of the semi-judicial and regulatory duties of the Board. The Fleet Corporation would have charge of the actual operation of the ships and the shipping council would have authority to inaugurate, maintain and develop foreign trade routes and services.

Philip S. Teller, who has succeeded Meyer Lissner as a member of the Shipping Board, has had an opportunity to exercise his diplomatic ability in the settlement of the difficulties of the Intercoastal Conference lines due to intensive competition for Westbound cargo. With the breach among the conference lines healed for the time being, it remains to be seen whether a way can be found to bring the non-conference group into the fold. Negotiations to that end are now under way as a result of the mediatory action of the Shipping Board.

Apropos the intervention of the Shipping Board under the provisions of Section 19 of the Merchant Marine Act, the point has been raised that it might be extremely difficult for the Board to prove that rates were reduced for the sole purpose of driving out a competitor and the question also has been raised as to whether one line could in fairness be expected to continue charging a rate materially lower than the other lines in the trade were quoting at the same time. There has been no disposition on the part of any of the conference lines to take issue with the Board, however, unless this became absolutely necessary and its intervention has been welcomed by several of the members of the Intercoastal conference.

Winthrop Lippitt Marvin

The death of Winthrop L. Marvin, vice-president and general manager of the American Steamship Owners' Association, was a great shock to Eastern shipping men and also has inflicted a great loss upon the industry, as Mr. Marvin was undoubtedly the ablest and most untiring of all the advocates of the upbuilding of the American merchant marine. He had been a close student of the various phases of the shipping problem during the greater part of his life, and, by reason of his ready command of language and extensive knowledge of the subject, was a most effective and persuasive pleader for the establishment and maintenance of a privately owned merchant marine under the American flag. Shipping men feel that with his passing they have lost a faithful friend and wise counsellor.

Maston Anniversary Marks Fulfillment of Vision

TWENTY-FIVE years ago the Matson Navigation Company was formed to take over the marine transportation business theretofore built up and conducted by that sterling Pacific Coast viking, Captain William Matson, and his associates.

This company, under the leadership of its founder and of his successors, has developed one of the most popular and successful passenger and freight steamship services under the American flag and has established a world-wide reputation for the ability, courtesy, and efficiency of its operating personnel.

It is a long hard road that Captain Matson traveled—from the trading schooner of his youthful days to the consummation of his vision—but the young man had a rugged strength. keen insight, and great perseverance, and he liver to see his dream realized on a lavish scale.

The present imposing headquarters building in San Francisco, a splendid chain of terminals and hotels in the Hawaiian Islands, and a large fleet of modern passenger and freight steamers, soon to be augmented with the finest passenger liner under the American flag, stand today a well-earned monument to the genius of Captain William Matson.

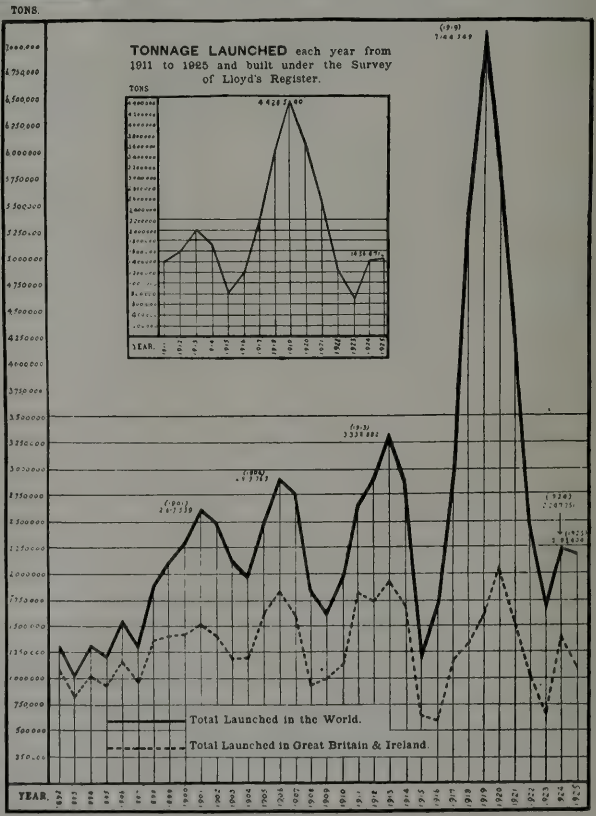
Shipbuilding and Shipping

THE interesting graph reproduced herewith shows on analysis some remarkable features which should be carefully studied by shipbuilders and ship owners.

Consider the peaks of the world's t otal launchings line. That of 1919 was the highest in world history. That of 1924 was the lowest in this century thus far. The angle of declination through the year 1924 is the flattest of the series, while for the same period the Great Britain and Ireland line shows a much sharper decline.

It is significant that during the past six months, while the volume of shipbuilding in the world is slowly falling and that of Great Britain rapidly declining, American yards are beginning an upward trend. During the past six months the tonnage ordered and under construction in American yards has increased over fifty per cent. The total tonnage in American yards is still so low that this increase causes hardly a ripple in the line of totals; but the upward trend is there and illustrates the benefits that come to American shipyards and American ship operators from the restriction of American coastwise traffic to American bottoms.

In the foreign trading merchant marine we are making slow but sure headway and, if we can get an even break in legislation at Washington, we have every reason to look forward with confidence to steady improvement in the American shipbuilding and shipping situation.



Nine Launchings, Three Keels in One Afternoon

Most Unique Event in History of American Shipbuilding Planned at the Newport News Shipbuilding and Dry Dock Plant

LAUNCHING nine ships and laying the keels of three others within three hours is the program of the Newport News Shipbuilding and Dry Dock Company for March 20, 1926.

The vessels to take the water embrace five different types, ranging from a seagoing passenger and freight liner to private yachts costing a half million dollars each.

Never before in the history of American shipbuilding have so many ships of so many different kinds been launched in one day. Of the three keels to be laid, two are sister ships, twin-screw Clyde liners, carrying accommodations for 930 passengers; and the third, a ship over 600 feet long for the Panama Pacific Line and said to be the largest commercial ship ever contracted for in the United States. The latter keel will be laid in the giant $4,000,000 ways originally constructed for the Constellation and the Ranger, the great battle cruisers which the Government ordered scrapped while still in an uncomplete state, in agreement with the terms of the Disarmament Conference.

Details of the nine ships to be launched on March 6, are as follows:

Dorchester, freight and passenger steamer for the Merchants & Miners Transportation Company; hailing port, Baltimore; length over-all, 368 feet; gross tonnage 5600; accommodations for 316 passengers. Oil-burning boilers; triple expansion steam engine; single screw. (This is one of the three Merchants & Miners ships now on the ways at the yard.)

The Savarona, fast, seagoing and coastwise yacht, for Richard M. Cadwalader, Jr., Fort Washington, Pennsylvania; length over-all, 185 feet; crew, 25 in all; 7 staterooms; 6 bathrooms. 1600 horsepower twin-screw Winton diesel. engines. Speed, 16 knots; cruising radius, 9,000 miles. The yacht is beautifully appointed, with the lounge finished in American walnut and the living room in teak. This yacht is designed by the well-known naval architects and engineers Cox & Stevens of New York and will fly the flag of the New York Yacht Club.

The Josephine, fine seagoing and coastwise yacht, for E. S. Burke, Jr., Cleveland, Ohio, length over-all, 140 feet; crew of 15; 5 staterooms; 5 baths. Twin-screw Winton diesel engines. This boat is capable of going to sea under all canditions. The library is finished in walnut; living room is panelled teak. She was designed by Cox & Stevens, naval architects, New York, and will fly the flag of the New York Yacht Club.

The Aras is a beautiful seagoing and coastwise yacht of 162 feet length over-all for Hugh J. Chisholm of Portland, Maine. This yacht will also have commodious accommodations for owner and guests and have a wide cruising radius. Twin-screw Winton diesel engines are to be used. The main deck contains the dining room, children's room, and lounge. She will be finished largely in walnut. The yacht was designed by Bath Iron Works, and will fly the flag of the New York Yacht Club.

Three steel house barges will be launched for the Chesapeake and Ohio Railroad of 160 feet length over-all length, and are for service in Hampton Roads. These are being built by the unique method of assembling the sides and ends in different portions of the dock, then conveying these parts by a 75-ton crane to where the final assembly is made.

A steel car float is to be launched also for the Chesapeake and Ohio Railroad of 160 feet long over-all, for service in Hampton Roads.

The dredge Raymond for the United States War Department for service on the Delaware River; 227-feet long over-all; diesel dredging engines, is to be launched.

All of the seven ships in process on the giant $4,000,000 shipways will be launched by a floating method, rather than in the usual manner. In order that visitors may witness both methods of launching, the two remaining ships of the nine—the new Dorchester of the Merchants & Miners Transportation Company and the War Department dredge Raymond will slide down greased ways in the familiar fashion.

The method of floating-launching is possible due to the unique size and construction of the two shipways. In order to take a keel larger than ever before laid down in America (that is for the battle cruisers Constellation and Ranger, for which these ways were originally constructed) the ways were extended both backward and forward to a depth of 1000 feet. At the James River end is a cofferdam extending out into the river. Accordingly, the river is some feet higher than the lower end of the ways. By opening the gates of the cofferdam, the water will rise far up the ways and the seven ships will then float.

Details of the three keels to be laid are as follows:

For the Clyde Steamship Company two twin-screw passenger and freight ships, length 404 feet; oil burning, with 8500 horsepower geared turbine engines; speed, 18 knots; accommodations for 930 passengers; hailing port, New York.

For the Panama Pacific Line, the largest merchant keel ever contracted for in an American shipyard—over 600 feet; electrically driven engines, 18,000 horsepower; oil burning, twin-screw. Accommodations for 745 passengers. Hailing port, New York.

The latter three ships will occupy the two ways where the Constellation and the Ranger were.

It is planned to make the 20th of March a gala day on the Peninsula. In view of the unusual interest to the public of this unique launching, the Newport News Shipbuilding and Dry Dock Company is throwing open the entire yard to the general public on that afternoon and it is expected that the previous record of 30,000 visitors will be well exceeded on that day.

The freedom of the entire 125 acres within the grounds will be given the visitors. For the many engineers who will attend, groups

(Continued on Page 142.)

Arbitration in Settlement of Shipping Disputes

By Norman F. Titus, Manager, Claims—Insurance
McCormick Steamship Company.

A DISCUSSION of this subject should be treated logically under two heads; first, the practicability of arbitration in commercial disputes, and, secondly, its value as a remedy in controversies over shipping contracts; i. e., bills of lading, charter parties, etc.

It has been said that, next to war, commercial litigation is the largest single item of preventable waste in civilization. The sad feature of it is that wars are chiefly sporadic and localized, while litigation is continuous and universal. It is a common experience of all of us that resort to the law is tremendously expensive, to say nothing of being tedious and time devouring.

Never Fight a Customer.

Aside from all these obviously glaring defects of litigation, there is one violation of good salesmanship that is perhaps the most vital of all, and that is that one of the parties to every dispute is generally a customer. It is bad business to fight a customer. The result is that the customer is lost. The nature of business is such that honest differences of opinion are bound to arise, and all too often, resort is made to the courts. Here the delays, the expenses, the exasperating technicalities of the court room, the badgering of witnesses and principals by the lawyers, and the general publicity of the thing react on all concerned and, psychologically, the result is that, irrespective of the court's decision, the litigants depart as enemies forevermore. Certainly some remedy should be provided to settle such honest differences of opinion without this disastrous result.

As a remedy for this condition arbitration stands supreme. The human mind has not devised a solution more logical, satisfactory, or efficient. In addition, arbitration is private. No one except those immediately involved is present and the proceedings need not be published. There is no hectoring of witnesses. Everyone sits around a table and, in effect, talks the matter over in every day language. The arbitrator sees to it that no one resorts to personalities. Most men can be friends when each is convinced that the other is animated by just motives. To be willing to arbitrate is a good indication of honest purpose.

Arbitration Laws.

Here, then, is a method of settling disputes that does not possess any of the shortcomings of litigation. Arbitration, on a limited scale, has been used since time immemorial to adjust disputes quickly, equitably, and without loss of good will. Arbitration was written into the laws of the Romans, and the idea was much used by the merchant guilds of the Middle Ages. Today arbitration laws—and arbitration laws armed with teeth—are on the statute books of America, Great Britain, Japan, and fifteen countries of Europe.

In Great Britain, the Arbitration Act of 1889 gave legal recognition to agreement in any contract to refer to arbitration any dispute that might arise, and, further, gave legal force to any award given by arbitration. The different provisions of the Act had been in force to certain extent for many years, but the Act codified the law of arbitration and put it on a simple, workable basis. Thus, for nearly forty years, business men of Great Britain have come to rely more and more on arbitration as a means of settling their disputes. Those trades that are most conspicious in their use of arbitration, according to the reports of British Chambers of Commerce, are: coal, corn and grain, raw cotton, and shipping.

In 1923, the International Chamber of Commerce acted vigorously in favor of arbitration and established a Court of Arbitration. In the same year, the League of Nations adopted a protocol which becomes operative, as far as any particular country is concerned, as soon as the legislative authority in that country ratifies its provisions, and so notifies the Secretary General of the League. The principal features of the Protocol are the validity of an arbitration clause and, secondly, its binding force as a judgment under the laws of the country involved.

In America, the foremost state law of arbitration is that of New York. It was passed in 1920. The essentials of the New York law are the irrevocable and enforceable features of a voluntary agreement to arbitrate, and the inclusion of an arbitration clause in contracts. New Jersey, Oregon, and Massachusetts have passed laws closely resembling the New York law. Like measures have been introduced in California, Indiana, Minnesota, Missouri, North Carolina, and Rhode Island. Seventeen other states have arbitration laws of some kind, and a movement is now on foot to enact amendments in these states to give their laws the practical values embodied in the New York statutes.

A federal arbitration law was signed by President Coolidge on February 12, 1925, and became effective January 1, 1926. Under this law, an arbitration award has the binding force of a judgment in a federal district court. The federal law is peculiarly adapted to interstate commerce and shipping. Let us observe, now, some practical applications of this principle of arbitration.

A Practical Example.

A striking instance of the value of compulsory arbitration to an entire industry is found in the motion picture business. About two years ago, this industry organized arbitration boards to decide the numerous disputes that come up between producers, distributors, and exhibitors. Lawsuits had been common, the distribution expense had been high, and there was a great deal of hard feeling. But today the situation is different. Most of the producers write arbitration clauses into contracts; in the industry there are thirty-one arbitration tribunals. In the first year of their existance these tribunals settled more than five thousand cases. It is illuminating to learn that the percentage of unanimous decisions in these five thousand cases was a fraction better than ninety percent.

Here, in San Francisco, we Occidentals can well profit by what goes on in Chinatown. Did you ever stop to think how seldom you see Chinamen restoring to the courts? The reason is that the poor, benighted heathen settles his business disputes by arbitration. The Chinese Six Companies sits as a court of arbitration and functions quickly, efficiency, and cheaply. The directors of the Six Companies serve without pay; hence there is no expense. Cases that would occupy our courts days, if not weeks, the Six Companies settles in one hour. And what the Six Companies decides, stays decided. Being purely patriarchal, its mandates are always obeyed. Ostracism would be the fate of any Chinaman that dared disobey. But, after all, this method is nothing but arbitration.

Questions of Fact.

Arbitration is endorsed by the foremost thinkers of the Bench, and the Bar, by business men and economists, and, most of all, by the inherent good sense of the community. Judges agree that from seventy-five to ninety per cent of the cases that clog our court calendars and so delay justice involve no questions of law, but are solely questions of fact such as, "Is this shipment of dried fruit choice or standard?"—"Did the contractor do this work in accordance with the plans and specifications?" Wherever and whenever it is tried, arbitration is almost invariably successful and the verdict is practically unanimous that it is civilization's best remedy for commercial disputes. The question at issue is—can this device be successfully used in settling disputes between shippers and shipowners?

It has been pointed out that the great majority of commercial disputes are based generally on question of fact, and arbitration is singularly successful in dealing with such situations. The reason is that arbitrators are men experienced in the trades involved and can decide questions of fact more surely than a jury; moreover, they can decide in an hour where a jury has to spend weeks. After all, the qualifications of the ideal juryman and the ideal arbitrator are the same; integrity, intelligence, and knowledge. The jury may rank high in honesty; it may have average intelligence; but it frequently lacks the special knowledge that the case requires. Herein lies the value of arbitration in shipping claims; the question at issue is generally one of fact. The controversy almost invariably arises due to the fact that our shippers do not understand the ocean bill of lading.

Arbitration Ideal in Shipping Disputes.

The bill of lading is one of the fundamental documents of foreign trade. It is the basis upon which the banker advances credit; yet it is astonishing how few shippers have any adequate conception of its structure. Unfortunately, the maze of fine print baffles even the most inquisitive shipper. The result is that all too few shippers realize that it is a limited liability contract. Custom has made it such, and even now when some lines, as for instance, the great British Peninsular & Oriental Line, offer two forms of bill of lading, an all risk bill of lading, and the ordinary limited liability form, the public almost invariably demands the limited liability bill of lading with its lower rates. Very rarely is an all-risk bill of lading issued.

Most shippers recognize the limited liability of the ocean bill of lading by supplementing it with a marine insurance policy. However, the delusion is quite prevalent that any marine insurance policy, plus an ocean bill of lading, covers all risks. How few shippers understand that bills of lading and marine insurance policies are opposite in construction and thus cannot be expected to supplement exactly each other. The bill of lading is exclusive in character; that is the shipowner agrees to deliver the accepted goods in the same condition in which he receives them except for a long and formidable list of things excluded. A marine insurance policy, on the other hand, is an inclusive document in that the assurers agree to pay losses arising from certain causes definitely and specifically listed in the policy. Obviously two documents so dissimilar in construction cannot supplement each other exactly. Thus it is that most shippers dwell in Paradise serenely thinking, at best, that the ocean bill of lading plus a marine insurance policy fully protects them.

Of principals underlying shipping documents the ignorance is appalling. How few, even of the professional traffic managers, know of the Harter Act, to say nothing of the various interpretations of this Act by the Supreme Court. There is probably no commercial contract that is so little understood as the ocean bill of lading; hence it is that there is probably no commercial field that is vexed with more controversy, nor with more exasperation and impatience, when disputes do arise.

As the points at issue are mainly those of fact, we have then an ideal field for the operation of arbitration, which, as has been pointed out, is singularly successful in dealing with issues of fact. From what has been set forth, it is evident that arbitration would be particularly effective in dealing with disputes involving bills of lading. The same arguments apply, however, with equal force to controversies concerning charter parties, marine insurance policies, salvage service, etc. Questions of fact are involved and experience and knowledge of the business are prerequisite to a just decision; arbitration is supreme.

If arbitration can be uniformly used in settling shipping disputes, then one of the greatest results will be the upbuilding of goodwill between shippers and shipowners; something that is lacking to a great extent at the present time. This goodwill is a very vital factor in any business, and must be active in American shipping if the American merchant marine is to occupy the same place on the sea that American genius occupies in the industrial field.

The Broadening Business Horizon

AMERICAN manufacturers and producers are not only looking to broader horizons for their markets but are discovering that their foreign competitors are doing the same thing. Attention is called to this rapidly growing interest in foreign trade by the Foreign Commerce Department Advisory Committee of the Chamber of Commerce of the United States.

"The increasing demands of business concerns for trade information, particularly information relating to the export trade," it says, "are marked. Taking numerical requests as one index of the business use of the government Bureau of Foreign and Domestic Commerce of the Department of Commerce, such requests increased last year by 75 percent over the year before, and the increase this year over last is proceeding at somewhat the same rate. Every week close to 40,000 requests for service are being taken care of by the Bureau. Of these some 9000 are requests for lists of foreign merchants and about another 9000 requests for addresses of foreign houses seeking connection with American exporters."

The American-Hawaiian Steamship Company

The Story of the Pioneer American Intercoastal Cargo Liner Fleet

Installment III --- The Post-War Period

THE American-Hawaiian fleet, requisitioned by the Government during the war, was not redelivered to the company until the latter part of 1919. Many of the vessels had been used to carry troops home and considerable work had to be done to restore them as freighters.

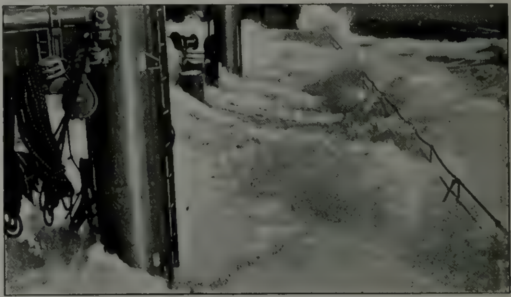
For a short while the fleet was employed in foreign trading, but in the latter part of 1920 the American-Hawaiian resumed their service in the intercoastal trade. Since then that trade has been the only one in which the vessels of the company have been employed.

The first Intercoastal Conference was organized early in 1921 and for a time functioned well. However, as more and more American shipowners began to realize that the best opportunity—or almost the only opportunity—for American flag ships lay in the protected coastwise routes, the competition in the intercoastal end became more and more acute. In June, 1922, the Conference broke and then followed the so-called rate war, lasting for over a year, and finally resulting in the re-formation of the Conference.

An American-Hawaiian cargo liner discharging at the Commonwealth Dock, Boston

In 1919 W. A. Harriman became identified with the company as stockholder and director and, when George S. Dearborn, who had been the company's first and only president, died in May, 1920, Mr. Harriman took active charge, serving as chairman of the board with Henry Dearborn as president. Mr. Harriman had other shipping interests and, to take over the handling of the different shipping properties in which he was interested, the United American Lines were organized and the operation of the American-Hawaiian fleet placed in the hands of that concern.

American-Hawaiian liner transiting the Panama Canal


The American Hawaiian motorship Missourian bucking rough seas on the Atlantic.

When the American-Hawaiian fleet was returned to the intercoastal trade their vessels were operated for a time in the service of the United American Lines but, as that organization was largely interested in the Atlantic and other trades as the competition and problems of the intercoastal end became increasingly burdensome, it was finally thought best to operate the American-Hawaiian fleet under its own name and with its own organization. Mr. Harriman and other stockholders of the company asked Cary W. Cook to take over the management, and on March 20, 1923, he was elected president. Mr. Cook had been identified with the company for many years, first as its agent at Seattle and later at San Francisco as Pacific Coast manager. During the war Mr. Cook volunteered his services to the Shipping Board, serving first as Director at San Francisco and later as Acting Director of Operations at Washington. He resigned from the Government service immediately after the Armistice and had returned to the Coast.

American-Hawaiian motorship Californian coming up to berth at Philadelphia. New Delaware River bridge in the background.

Headquarters at San Francisco.

Mr. Cook's first act after taking office was to transfer the headquarters of the company from New York to San Francisco. Believing that the future of the company lay on the Pacific, he thought it only proper that direct executive contact should be had with shippers and consignees on the Coast. He also established company offices at most of the ports where vessels of the company called. He believed that the interests of the company and its patrons would be better served by agents whose entire time and attention could be devoted to American-Hawaiian business. At the present time the company maintains offices at Los Angeles, San Francisco, Oakland, Portland, Seattle, New York, Boston, Philadelphia, Pittsburgh, Rochester, and Chicago, and has agents at Tacoma, Astoria, Baltimore, Norfolk, and Charleston.

With the establishment of company headquarters at San Francisco it naturally followed that the outfitting of the vessels, as well as repair and maintenance work was centered at that port.

New Organization.

Mr. Cook's task in building up a new organization was a difficult one. He was ably assisted by John E. Cushing, who resigned as a member of the firm of Williams, Diamond and Company to take over the position of traffic manager. Williams, Diamond and Company had been agents of the company at San Francisco from the beginning and had also acted as agents for the United American Lines. Mr. Cushing had served in the Army Transport Service during the war and later on had succeeded John H. Rossiter as Director of Operations of the Shipping Board, resigning when Chairman Payne went out of office.

Thomas G. Plant was appointed operating manager. Mr. Plant had served as assistant to Mr. Cook when the latter was Pacific Coast manager of the American-Hawaiian; had been on the Shipping Board staff at San Francisco during the war; and was afterwards identified with the firm of McCormick, McPherson and Lapham.

R. D. Lapham, who had entered the employ of the company in 1905 and who had been agent at Seattle, agent at Los Angeles, and assistant traffic manager of the company before the war, was elected treasurer, succeeding V. H. Thun, who retired at his own request.

Mr. Cook stressed the importance of giving the trade a dependable schedule, and sailing dates from the different ports have been fixed months ahead and, except for slight delays occasioned by unusual circumstances, have been lived up to.

American-Hawaiian steamship discharging at Los Angeles harbor.

American-Hawaiian motorship Californian with Portland waterfront in the background

During his term of office negotiations were started leading to the purchase of six "Santa" vessels from W. R. Grace and Company, eventually resulting in the establishment of regular five-day sailings. At the present time the company has employed in its regular service seventeen vessels, operating on an eighty-five day turn-around. Of the remaining nine vessels of the fleet some have been laid up, while others have been operating irregularly, carrying full cargoes of lumber East and loading out from South Atlantic ports.

After Mr. Cook had put in two years of arduous work he expressed a wish to be relieved of active responsibility. In June, 1925, Mr. Cook was elected chairman of the board, while R. D. Lapham succeeded him as president.

Regulating International Trade

STEPS looking to the suppression of unfair competition in international trade are under consideration both by governments and business at the Conference for the Revision of the International Convention for Protection of Industrial Property in session at The Hague.

The conference itself is unusual in that it is not only an official gathering with delegations from 32 governments but that international business, represented by a delegation from the International Chamber of Commerce, sits at the same table, at the specific request of the conference itself, to act in an advisory capacity.

American business is represented on the International Chamber delegation by Franklin Hutchinson, general patent attorney of the International Western Electric Company, and Bernard Shoninger, former president of the American Chamber of Commerce in Paris.

The American committee has proposed that matters relating to the granting and protection of patents be concentrated largely at the international bureau at Berne. It has also advocated the establishment of a Permanent International Committee also favored by the International Chamber, to act as a court of arbitration with respect to any controversy concerning rights in industrial property between subjects or citizens of any two contracting countries. The idea of the American committee is to set up a central international body to safeguard standards of international business practice.

The McCormick Steamship Company

A Short Story of the Remarkable Development Leading to the Purchase of the Pacific-Argentine-Brazil Line By Pacific Coast Lumber Interests

THE recent purchase of the Pacific-Argentine-Brazil Line has focused the attention of the maritime fraternity on the McCormick Steamship Company.

The prominence obtained has not been the result of an over-night growth, but is the culmination of a development that has been going on steadily since the McCormick interests were started some twenty odd years ago.

The present McCormick organization has expanded from the initial lumber brokerage business formed by Chas. R. McCormick and Sidney M. Hauptman in 1903 until today it is a nation-wide organization covering large stands of timber, lumber mills, shipyards, a creosoting plant, and numerous distributing yards along the Pacific and Atlantic coasts, and a steamship company that operates a fleet of more than seventy vessels in the coastwise, intercoastal and South American trades.

Offices of the steamship company are maintained in all cities along the Pacific Coast and, through agents, on the Atlantic Coast and in the cities on the East coast of South America. The basis for the development of the McCormick interests has been lumber.

The initial lumber brokerage venture of Mr. McCormick and Mr. Hauptman proving successful, the enterprise expanded rapidly. The Bendixen shipyard of Eureka was taken under lease, and each year from 1903 to 1921 the McCormick enterprise added a new vessel to the American merchant marine. The vessels were passenger steamers as well as freighters. Many of these were sold to other lines, but the eight ships retained constitute the fleet from which the present large scale steamship operations have developed.

Charles L. Wheeler, vice-president and general manager, McCormick Steamship Company

The steamship Sidney M. Hauptman, of the Munson-McCormick Line.

The requirements of the consuming centers of California for large quantities of lumber actively engaged the ships of the McCormick Lumber Company in the transportation of forest products. The movement of lumber cargoes was entirely southbound, with a correspondingly heavy movement of general merchandise north. To assist in the growth of the cities of the Pacific Northwest and to insure profitable return ventures, the McCormick ships engaged in this northbound merchandise movement under private charter. The profitable combination interested Mr. McCormick to a point of associating himself with Fred Parr, and as the result the Parr-McCormick Steamship Company was organized. This company continued to operate the McCormick ships until 1921 when Mr. McCormick decided to enter the general steamship operating business on his own account.

The McCormick Steamship Line was organized with Mr. McCormick as president and Charles L. Wheeler as vice-president and general manager. The McCormick Steamship Line established weekly service to Portland and to Puget Sound, and gradually increased the number of sailings and vessels available for these services.

In 1922 the McCormick Steamship Company was incorporated, taking over the personnel and ships of the McCormick Steamship Line and further augmenting the northbound service to two sailings each week to Columbia River and Puget Sound ports.

The coastwise service being in a constantly better condition, the McCormick Steamship Company interested itself in the intercoastal trade. After acting as general agent for an intercoastal line, Mr. McCormick decided, early in 1923, to enter that business, and organized the McCormick Intercoastal Steamship Company in San Francisco, purchasing two vessels from the United States Shipping Board for that service. These vessels were rechristened the Charles R. McCormick and the Sidney M. Hauptman.

In 1923 the McCormick interests entered into an alliance with the Munson Steamship Line of New York under which the Munson-McCormick Line was established in the intercoastal service, each of the two interests contributing ocean steamships for the new service. The facilities of the Munson Line on the Atlantic Coast are utilized to supply westbound cargoes of general mer-

The intercoastal steamship Chas. R. McCormick, owned by the McCormick Steamship Company and operated on the Munson-McCormick Line in the intercoastal service between New York, Baltimore, Philadelphia, and Boston, on the Atlantic Coast, and Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma on the Pacific Coast.

chandise and products of manufacture, and the McCormick interests load these vessels with full lumber cargoes for the Atlantic Coast. These cargoes of Pacific Northwest timber are distributed through the offices and agencies of the Chas. R. McCormick Lumber Company located in all Atlantic Coast ports. So well did the Pacific coastwise and intercoastal trades develop that, in the fall of 1924, the McCormick Steamship Company purchased the steamer Rose City from the Portland and San Francisco Steamship Company, a subsidiary of the Union Pacific System. Since that time the steamer Rose City has maintained a high-class fast passenger and freight service between Portland San Francisco and Los Angeles. This purchase enabled the McCormick Steamship Company to effect through rate arrangements with the Union Pacific Railway to interior points of the Inland Empire, thus opening up this immense territory to easy access of the California markets.

Both the coastwise and intercoastal trade increased until there are today approximately sixty sailings a month between ports on the Pacific Coast, and a weekly intercoastal sailing is maintained from New York and Baltimore with bi-weekly sailings from Philadelphia and Boston.

The trade between the Pacific Coast and South America has increased constantly in the last five years. To take care of the increasing demands for Pacific Coast products in the Argentine and in Brazil, and to supply American manufacturers with the wares of South America, the United States Shipping Board established the Pacific-Argentine-Brazil Line. Since its inception this line has been successful in promoting friendly relations and increasing the volume of trade between South America and the United States.

In conformity with the policy of the Shipping Board to dispose of its services, the McCormick Steamship Company has purchased the Pacific-Argentine-Brazil Line. The fleet consists of six 8800-ton class-A freighters. These six vessels, the steamers Hollywood, West Mahwah, West Cactus, West Notus, West Nilus and West Camargo, maintain a monthly service between the ports of the Pacific and Buenos Aires, Bahia Blanca, Montevideo, Santos, and Para, as such other ports as offer inducements.

Contract of sale provides that the line remain in this service for a period of five years, and at all times be a credit to the American merchant marine.

It is confidently believed that the friendly relations between South America and the Pacific Coast of the United States will be constantly bettered as a result of increased trade and shipping activities.

The McCormick organization is now international. Its lumber products are in use throughout the world. Ships flying the McCormick house flag ply the length of the seaboard of the United states and carry the flag to the ports of South America. The McCormick organization stands as a monument to the vision and foresight of Chas. R. McCormick and the men associated with him.

New Japanese Motorships

THE Osaka Shosen Kaisha are placing three new diesel ships in their round-the-world service. The first of the new vessels, the Santos Maru, will sail from Rio de Janeiro on March 22, 1926, and arrive at New Orleans on April 7. The vessels will afford a fifteen-day service between Rio de Janeiro and New Orleans. The three new diesel vessels will replace three of the smaller type ships now in the service. From New Orleans the vessels will sail via Los Angeles to Yokohama and Kobe.

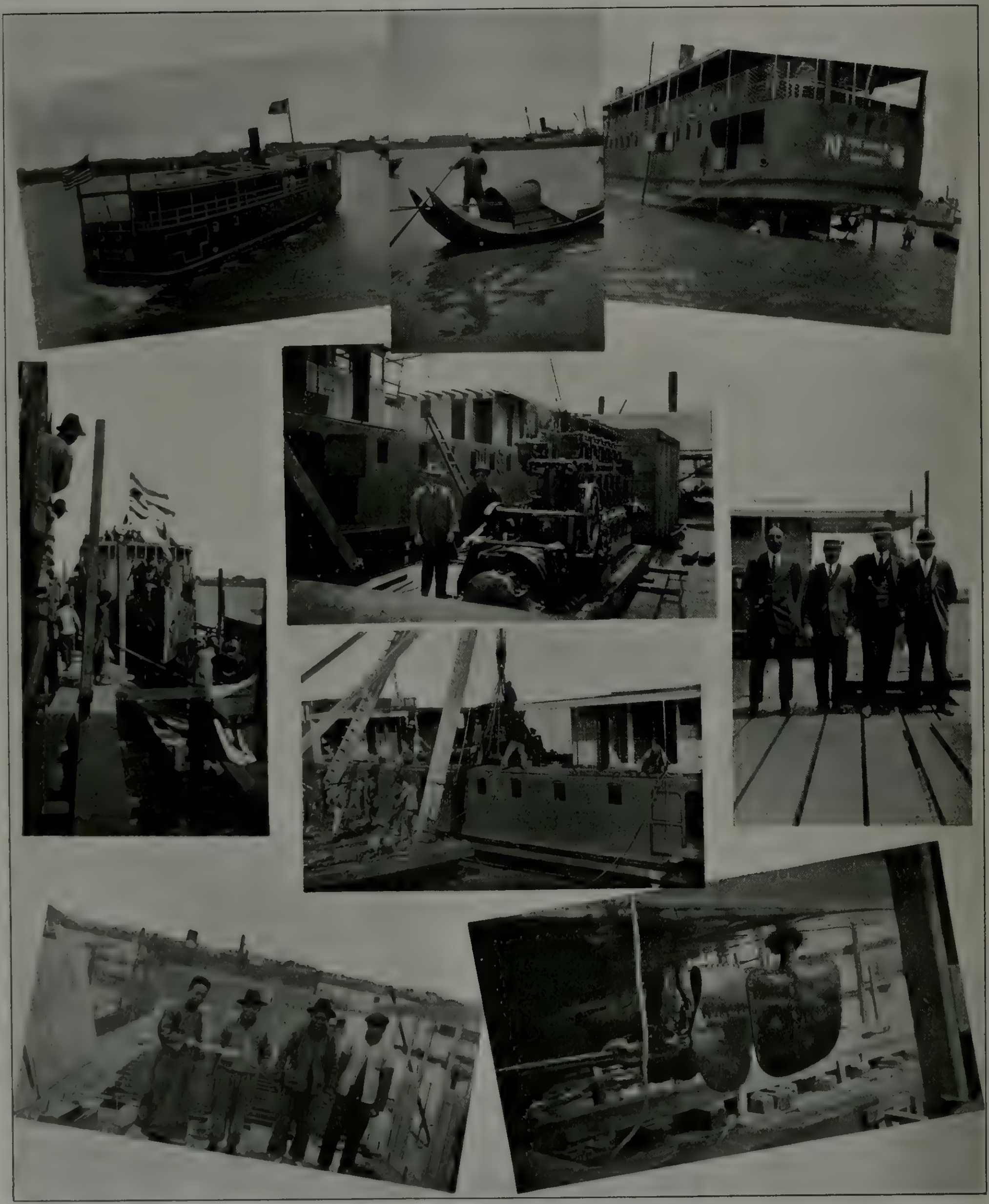
The steamship Hawaii Maru of 17,639 tons displacement, and the Manila Maru of 17,475 tons displacement, both of 16 knots speed, will be continued in the service. The new vessels are equipped with Sulzer 2-cycle diesel engines and have the following capacities: Gross tonnage, 7800; cargo capacity, 5400 tons; frozen cargo capacity, 255 tons. They have passenger accommodations for 70 first-class and 700 third-class.

These vessels are provided with the most modern navigational equipment, in which are included the Sperry gyro-compass and gyro-pilot and Sperry visible air whistle.

Modern first-class passenger accommodations are provided, consisting of a brilliant saloon, smoking room, social hall, bars, veranda cafe, swimming tank, and broad promenade decks.

The steamer Hollywood, which with five sister vessels constitute the Pacific-Argentine-Brazil Line of steamers operating under the McCormick house flag.

Atlas-Imperial Solves China's Age-Long Navigation Problem



Views taken in Shanghai showing the Yangtse River motorboat Foo-chuan and the installation of the Atlas-Imperial engines for driving her twin screws. Note the triple rudder scheme. This arrangement has been found very effective for maneuvering in the rapids of the Yangtze gorge.

Pacific Workboats and Their Power Plants

The Boatyards of San Francisco Bay

BUTTING out sharply into San Francisco Bay just south of the San Francisco port is a rocky hill known as Hunter's Point. Here is located the famous Hunter's Point Docks, two graving dock basins, the larger of which is the largest commercial drydock in the United States. Just north of this point is a sheltered cove where the conditions are ideal for marine ways.

The district has for many years been noted for the many boat yards where workboats, scows, and barges have been built. There are several different firms engaged in this business, and besides building, a great deal of repair work is done. Many small craft are hauled out on the ways there to be painted and cleaned, and at times several vessels will be laid at the wharves waiting turn to dock.

The principal yards are Anderson & Cristofani, Bruer & Seimer, Geo. W. Kneass Co., John Twigg & Sons, H. C. Thomson, and Schultze & Schultze. All of these have been in business for the past twenty years and more, and during that time many workboats have been built. Occasionally, too, a pleasure craft is turned out, and several speedy sailing yachts have also been launched from these yards.

THE GEORGE W. KNEASS CO.

The two views on this page were taken recently at the boatyard of the George W. Kneass Co., San Francisco. The upper illustration shows the launching of a tugboat, with the shipbuilding ways of the Union plant of the Bethlehem Shipbuilding Corporation in the background. Below is shown one of the Pacific type fishing boats in frame.

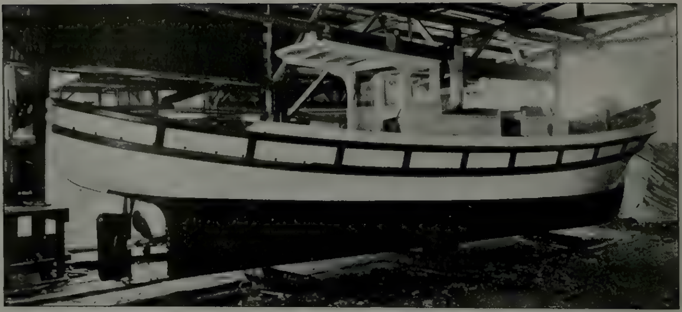
Accompanying this brief note are several views recently taken by a Pacific Marine Review representative with the object of showing that the old Hunter's Point reputation is still being maintained as a workboat resort.

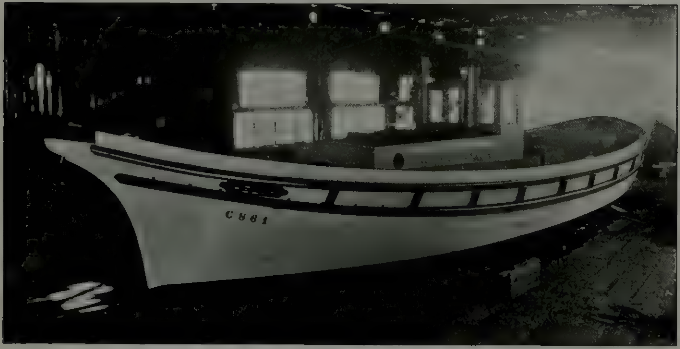
Oakland Estuary

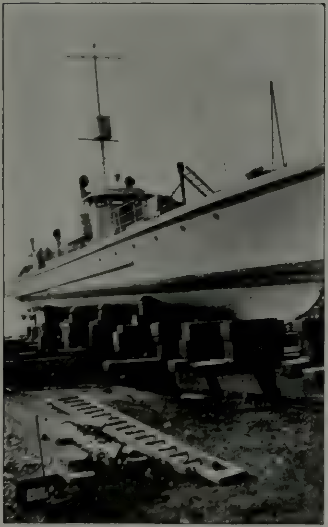
The Estuary at Oakland, California has many small boatyards devoted mainly to workboat building and repair. Besides these, many yachts have also been built there. Swanson's Launch & Boat Works at the foot of 19th Avenue does a great deal of business in the lines mentioned above. Mr. Swanson reports business good, with fine prospects ahead. Associated with the yard interests is Captain F. P. Worcester, whose specialty is the designing and building of pleasure craft. His latest production is a cruiser yacht for Randolph W. Apperson. This craft is 45 feet by 10 feet 4 inches, with a draft of 36 inches. She will be powered

SOME SAN FRANCISCO BOATYARDS

At the right and below are shown stern and bow quartering views of the completed hull of the Pacific Coast type of fishing boat at the yard of George W. Kneass Co. The three views at lower right show various types of workboats undergoing repairs at the Hunter's Point yards of Anderson & Cristofani and Bruer & Seimer.

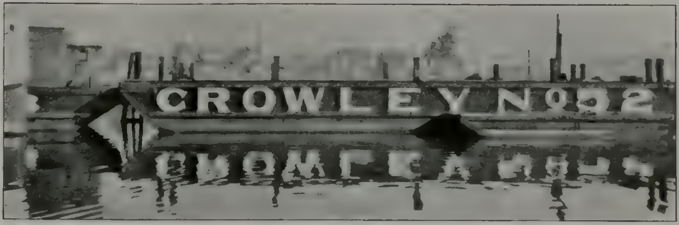






Above, a Coast Guard rum runner chaser hauled out on the ways at Crowley's shipyard, San Francisco Bay. This boat is undergoing repairs after a hot battle during which she captured the rum runner Virginia I.

with a Hall-Scott medium duty engine of 100 horsepower. Fitted with a 2 to 1 reduction gear, this engine will turn a 28-inch diameter by 28-inch pitch propeller at some 1000 revolutions per minute. A speed of well over 20 miles per hour is expected. A feature of this vessel is the installation of five water-tight bulkheads, dividing it into six compartments. This will make the boat practically unsinkable. The lay-out for comfort and convenience in the living, cooking, and storeroom divisions is remarkable for its completeness, every inch of space being utilized and at no loss of beauty or strength. The yacht will be a fine addition to the Lake Tahoe fleet.



One of the huge fleet of barges operated on San Francisco Bay by the Crowley interests.

General view of Crowley's shipyard on the Oakland Estuary, San Francisco Bay.

Stone's

W. F. Stone & Son yard near Canal street on the Oakland estuary has been known for many years as a place where speedy yachts and staunch workboats are built. The founder of the firm, the late Frank Stone, was one of the best known builders on the coast. His work is now being carried on by his son Lester Stone, who gives equal attention to business. While not the largest establishment on the estuary, the yard is well fitted for small repairs and building. A view in this issue shows the Union, built twenty five years ago, and in active service ever since. She is the first of the Union Fish Company's fleet, and the nucleus of a vast business. A comparison of the old craft with some of the modern ones shows what advances have been made in such units during the past quarter of a century.

Crowley's

At the Oakland yard of the Crowley Launch and Tugboat Company there is considerable activity in repair work. Besides this, commencement has been made on construction of six barges 125 feet long, 40 feet beam, and 12 feet depth. To handle these, two workboats of the 70-foot type are also to be built. These will be engined by Pacific Diesel Engine Co. units, 300 horsepower each. This program will mean an expenditure of some quarter of a million dollars. The increase in the Crowley fleet has been found necessary owing to volume of freighting business in San Francisco Bay. It will also bring the Crowley Launch and Tugboat Company into the first rank as regards numerical strength of vessels. For several years this firm has operated a building and repair yard for its own vessels, as well as doing work for outside parties. Fully equipped machine, blacksmith, plate, and carpenter shops, modern in all respects, make it easy to handle all kinds of marine work. A 1000-ton marine ways, with a smaller one of 500 tons' capacity, provide for rapid service in docking for painting and repairing.

The steam tug Sea Rover is having a new boiler installed at Crowley's Oakland yard. The original boiler was built by the late Peter Phelan of the old Fulton Iron Works, San Francisco, and has given splendid service for the past twenty years. The Sea Rover was in the United States Navy service during the World War and made a fine record. Her steel hull is in good shape, as are the engines, and with a new boiler she will be as able a seagoing tug as most of them.

The rum smuggler, Virginia I, has been thoroughly overhauled and rebuilt at the Crowley Oakland Yards. This vessel had an eventful career and was captured,

The motor sloop Union, first unit of the Union Fish Company's fleet to be equipped with power. The Union gas engine in this craft has been operating satisfactorily for many years. She is here shown hauled out on the ways at the yard of W. F. Stone & Son, Oakland.

Workboat and pleasure craft on the marine ways at Wm. Cryer & Son's yard, Oakland, California.

after a brisk fight, by one of the chasers of the Coast Guard Service.

Cryer's

The William Cryer Yard at foot of Dennison Street, Oakland, has for many years been noted for good work. This record insures business even in slack times. Just now the yard is finishing a yacht for W. R. Voorhies of San Francisco. She is 50 feet length with a beam of 11 feet and a depth of hold of 6 feet 9 inches. She will be propelled by a 165-horsepower Sterling-Dolphin engine. The hull was designed by Nordstrom of Seattle and is well proportioned with easy lines.

Besides new work, considerable repair business is done, among one of the latest being the rehabilitation of the workboat Lieutenant Murphy. This vessel, formerly in the navy service, had a steam engine for power. She was also sunk for some weeks and, on being raised, came into the hands of private parties. The steam engines have been removed and a 150-horsepower gas engine installed by the Standard Gas Engine Company. The hull has been thoroughly remodelled as to deck fittings, though the original main body needed no change being very staunchly built. When completed she will go into hard work towing barges for a sand and gravel firm.

Workboats under repair at Swanson's Yard, Oakland, California.

Another interesting workboat at Cryer's yard is the Ocean Queen, a former Monterey vessel. She got tangled up in a rum smuggling business and was badly perforated by machine gun fire before captured by a rum runner chaser. She was bought by the Burnett interests, and is now being repaired, after which she will go back to more prosaic work towing and general service.

New Coastal Service

THE steamer Cleone, whose picture appears here, is not in the strict sense a workboat, but is of the lumber steam schooner variety and among the smaller members of that family.

The steamer Cleone, a Pacific Coast freight boat.

The Cleone has recently been put on a regular run from San Francisco to the Russian Gulch country in Mendocino County, California, a run of about 135 miles, by the Mendocino Steamship Company of San Francisco. A weekly service will be maintained by the steamer with truck connections to important centers in Mendocino County.

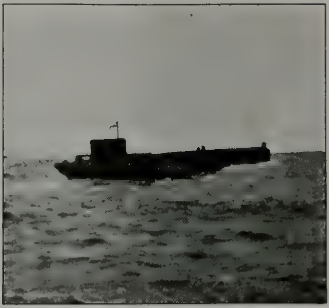
The officers of the company are A. R. Moylan, traffic manager of The Paraffine Companies, Inc., president; L. H. Hofmann of Hanson & Hofmann, vice-president; and E. B. Bronte of the White Flyer Line, traffic manager.

This is the first regular service to be extended into the Russian Gulch territory, and it is said by officials of the new company that its establishment is meeting with enthusiastic approval of the shippers in that section. Previously, vessels of the Union Lumber Company, which carried the company's products from their mills, carried freight inbound on an irregular schedule.

Workboats at Eureka, California

EUREKA, metropolis of the Redwoods, has a harbor where the ever-busy workboat is much in evidence. Though the marine activities are not as varied as in some ports, there is sufficient business to keep quite a fleet of small craft going. Most of the work is identified with lumber and commercial fishing industries. Towing of lighters, moving of vessels from berth to berth, transportation of gangs of stevedores to their labors, hauling freight and passengers between the many small ports on Humboldt Bay, and carrying on in Eureka's big sea fisheries, provide much work for many boats.

The Coggeshall Launch and Towboat Company own and operate four workboats, powered by Standard gas engines of sizes from 30 to 110 horsepower. The company also has a larger boat, the Magnolia, of 80 tons with two Standard 40 horsepower engines. She is used as a freighter between Eureka, Klamath, and Rogue River, making trips to Crescent City during the summer season. In addition, the ferry steamer Antelope is owned by this firm. She is steadily on the Eureka-Samoa route. A heavy fuel oil and water barge is also handled by the Coggeshall Company, as well as eight barges of about 175 tons each. The firm is a closed corporation, W. Coggeshall being the principal owner and manager. He is assisted by B. Gatliff. Both of these gentlemen are well versed in their line, as the shipshape appearance of the fleet will testify.



A barge crossing Humboldt Bar. This craft was built at the J. F. Ditty Yard, Eureka, and towed to San Pedro. The barge is of 900 tons capacity.

Another firm in the workboat business at Eureka is that of the Cousins Launch and Lighter Company. This firm was started many years ago by the late Captain Cousins and is now managed by his son Captain W. W. Cousins, who from his boyhood days has been around workboats. That he is "onto his job" is evident. Modern practice and operation are carried out, and while as yet the coming diesel has not been installed, Captain Cousins is alive to its excellence.

The Cousins fleet is composed of five general service workboats. Three of these are powered by 20, 50, and 85 horsepower Atlas-Imperial plants and two by 20 and 50 horsepower Standard gas engines. Four lumber lighters of about 220 tons each are also used. The business is principally towing log rafts for sawmills, shifting and berthing vessels. The steam tug, Humboldt, is also handled from the Cousins' office, as is the Humboldt Stevedoring Company.

From data supplied by Fred Barnum, secretary of the Harbor Commission of Eureka, it is a matter of official record that there are nearly 150 power boats operating from Eureka. These craft bring to the markets an average of over 600,000 pounds of fish. Much of it is chilled and shipped. Besides the fish, clams, crabs, and other shellfish are handled, and in the gathering of these the workboat is a big factor.

There are three concerns identified with the fishing industry at Eureka, besides several individual parties. The principal ones are the Western California Fish Company, the Eureka Fishing Company, and A. Paladini Inc. Mild cured and frozen fish shipping is carried on by these firms, salmon and halibut being the mainstays of the activities.

The J. F. Ditty Yard, at Woodley Island, just across the channel from Eureka, is the principal establishment on Humboldt Bay waters where vessels can be hauled out and repaired. Mr. Ditty, formerly associated with the Eureka Foundry, started the present business some fifteen years ago and has worked up a good trade. Several workboats and lighters have been built there, the Martha a speedy and able vessel of the 65-foot class being one of them. The marine ways can easily handle 500 tons. Docking and repairing have kept the yard busy and good prospects are in sight for continuance of the trade.

Fishing craft alongside wharf at Eureka.

Fire Protection

While all possible safeguards against fire on workboats have been made, sometimes the human equation or other cause gives a chance of a fire to start, and then things happen quickly. Usually the craft is burned seriously. Owing to the fact that, as a rule, but one man operates the vessel, any means of fighting a fire must be simple and positive. Such a system is the Lux. The makers of this positive control of fire have perfected an arrangement for small vessels where the turning of one valve will liberate the fire-killing gases, and this gas is so complete a smotherer of flames that even though fed by the more volatile oils and light fuels, a blanket of gas stops combustion almost immediately. Insurance companies and operators can now avail themselves of this fire extinguisher for even the smallest craft.

An Interesting Experimental Cruise

The Azalea, a 62-foot cruiser, now engaged in an 18-months' cruise to demonstrate in all American ports a new type of rotary valve internal combustion motor.

FLYING the flag of the Portland Motor Boat Club, the cruiser Azalea will leave the Columbia River early this spring for Seattle on the first leg of a cruise, the completion of which will take from eighteen months to two years. After a cruise of Puget Sound and British Columbia waters she will run down the coast touching at Eureka, San Francisco, San Pedro, San Diego, and ports on the Gulf and Atlantic Coast as far as northern Maine.

The Azalea is 62 feet long, 11 feet beam, 3 feet 6 inches depth, heavily constructed cruiser and seems to have been born to a career of adventure. She was originally built for the United States Immigration Service by Fellows & Stewart, Wilmington, California, subsequently being sold to parties in San Francisco who put her in the rum running trade. Her "side of the street" was from San Francisco to the Columbia River, and one fine afternoon upon being overtaken by a revenue boat, she was beached and deserted by her crew. Her present owners acquired her from the government and had her completely reconditioned, replacing her former power plant with two specially built 200 horsepower 6-cylinder, 4-cycle overhead rotary valve motors, the operation of which will be watched with interest by the entire boat and engine fraternity.

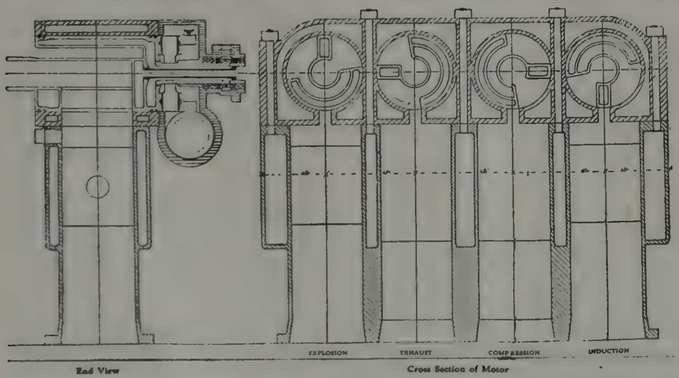
The basic patent for this type valve was awarded to Ruben F. Barker in 1918, and since that time Mr. Barker has been developing his valve and its application to automotive and marine engines. The original motor was built about four years ago and has been in constant use in a heavy automobile ever since, and at no time has it been necessary to remove the valves for inspection or make any adjustments.

The original thought of the inventor was the development of an overhead rotary valve applicable to any type of internal combustion or diesel type engine which would be internally cooled and capable of being driven at any desired speed. The engines in the Azalea comprise the base, cylinders, crank shaft, connecting rods, pistons, and ignition system of a conventional 4-cycle marine motor of standard make with the addition of a special head, rotary valves, and a positive mechanical drive described further on. As will be observed from the foregoing, these valves eliminate the use of cam shaft, valve tappets, guides, and valve springs.

The rotary valve, as will be observed from the accompanying drawings and photographs, consists of a rotary valve tube having a central longitudinal gas intake passage, an intermediate exhaust passage surrounding the intake passage, and a continuous longitudinal cooling medium surrounding the exhaust passage. This central gas intake passage has a port as indicated, and there is also a port connecting with the exhaust passage that surrounds the intake passage. These ports in the valve when rotating register with the port in the cylinder head, thus performing the functions of intake and exhaust.

The cooling medium surrounding the exhaust passage is also provided with inlet and outlet ports that are in constant communication with the water jackets in the cylinders. This method of direct water cooling the valves prevents them from overheating.

The valves are driven by bevel gears from drive shaft mounted alongside the head on the port side, the shaft taking its power from main crank shaft through an Oldham coupling. The valves run in ball bearings, and as their operation is in a continuous one-way direction, there is no load against them to cause wear or consume excessive power. An examination of the illustrations and their notes will fully describe the mechanical details and operation of these valves which seem to offer something for engineers and boat builders to think about.



Transverse and longitudinal sections through the cylinders and valves of the Barker rotary valve internal combustion engine.

Southern California Fishing Boats

Two Diesel-Powered, Completely Equipped Tuna Fishing Boats Complete Successful Trials at San Pedro

ON January 6 and 10 the two diesel-powered tuna fishing boats the Nisshin and the Enterprise, respectively, boarded by full crews and accompanied by friends and associates, made their official trial trips, each boat going to Catalina Island from Fish Harbor, San Pedro, for the day.

Each boat is 96 feet long, with approximately 20 feet beam and 9 feet depth, and both are powered with 250 horsepower, 4-cylinder, Western-Enterprise full diesel marine engines.

The fuel oil capacity of each is approximately 5600 gallons, which will provide a cruising radius of about 4500 miles. The fresh water capacity of these boats is 1000 gallons each and the lubricating oil capacity in excess of 300 gallons.

These boats were built complete by the Al Larson Boat Works of East San Pedro, California, and they have a carrying capacity of from 75 to 80 tons of iced fish. All tanks are of Armco rust-proof iron and the boats throughout are full cork insulated of 2-inch black cork laid in asphalt and sheathed with galvanized sheet iron. Also, all holds, decks and hatches are especially insulated, and it is anticipated that with the record catches to be made and the speed of the boats absolutely no waste of fish will be experienced in making the trip from the extreme southern fishing banks of Cape San Lucas to the San Diego or San Pedro canneries.

Officially recorded and carefully logged running time shows these boats capable of a speed of 11 knots per hour. The diesel engines installed were manufactured complete in the Los Angeles factory of the Western Machinery Company, and their smoothness of operation, freedom from vibration, and exceptionally low fuel and lubricating oil consumption mark them as the most outstanding installations among the fishing fleet in recent years.

The Nisshin is owned by Kobayashi, Yokoyama, and others, and the Enterprise by Chiba, Hiari P. Watanabe, of San Pedro, California.

Electrical Equipment in Small Craft

Numerous Boat Auxiliaries Now Operated By Electricity from Auxiliary Power Plants

ELECTRICITY in some form or another is now used on every type of pleasure craft, judging from the reflections of an enthusiast for the application of electric power.

Canoe, row and sailboat owners usually carry a pocket flash light, while those owning houseboats, yawls, ketchs, sloops, schooners, powered cruisers, and yachts are constantly adding new electrical features.

The power may be supplied by a battery charged at the boat house, by an automatic engine generator set for charging the batteries on board ship, or by a turbine, gasoline, or diesel engine driven generator. Nearly every make of the smaller marine engines exhibited at the New York Motorboat Show were equipped with a generator to charge a storage battery for ignition, starting motor and also to supply current for the running lights and other minor uses.

The tendency towards a greater application of electric power on pleasure craft, according to C. G. Meeker, a member of the Smith & Meeker Engineering Co. who exhibited Winton engine sets equipped with Westinghouse generators at the New York Motorboat Show, is due to the application of gasoline and diesel engines for propulsion.

Several years ago, Mr. Meeker recalls, when the steam drive was in its prime, very little attention was paid to electricity in any form by pleasure craft owners. Today it is seldom that even a rowboat owner ventures out at twilight on a mill pond without at least a pocket flash light.

In the larger type of pleasure craft, Mr. Meeker states it is nothing unusual for an owner to install one or more units of 5, $7\frac{1}{2}$, 10, or even 20 kilowatt generating sets to supply electric current for the search and running lights, for interior lighting schemes equal in attractiveness to many homes, hotels, and clubs, and generate power for 50 or 60 motors applied to do all forms of work aboard ship, such as refrigeration, cooking, electric steering, hoisting anchor, driving and controlling pumps, raising and lowering tenders, electric elevator service, charging batteries for radio apparatus, radio direction finder, and gyro compass, and to eliminate all other forms of drudgery and inaccuracy. During the night, particularly when the pleasure craft is under sail or at anchor, the power is taken off the batteries.

Hundreds of such plants have recently been installed in the better types of pleasure craft.

Al. Larson's yard at San Pedro is quite busy these days on repairs and new work. Two heavy off-shore fishing boats have just been completed. Several other boats are on the ways having repairs made. One of these, the Welcome, touched the rocks off the coast and tore up her stern planking and timbers badly. She is being rebuilt and will be as good as new when launched again. The outlook for more work is fine, and prospects are bright for all the business the yard can handle for the next year.

Quality Counts

FOR ninety-eight years—whenever ships sailed the Seven Seas, in the days of the old square rigger and in the days of the famous clipper ships, on ocean liners and fishing smacks—Stratford oakum has been used.

In establishing the reputation and prestige of Stratford Oakum, the manufacturers have accomplished a difficult task in securing world-wide acknowledgement of the superiority of the brand. Wherever oakum is used Stratford oakum is acknowledged to be superior. In every port of the world, in every shipyard, drydock and repair yard, you will find bales stenciled Stratford oakum.

Like many other manufacturers, the producers of Stratford oakum have waged a continuous, energetic battle to establish their product as one of quality. But as in every industry, shipping interests, once they find a superior product, usually specify it, and hence today Stratford oakum has attained a well earned reputation and standing.

Washington-Estep Sales Extension

Well-known San Francisco Firm to Distribute Famous Seattle Diesel Engine for the State of California

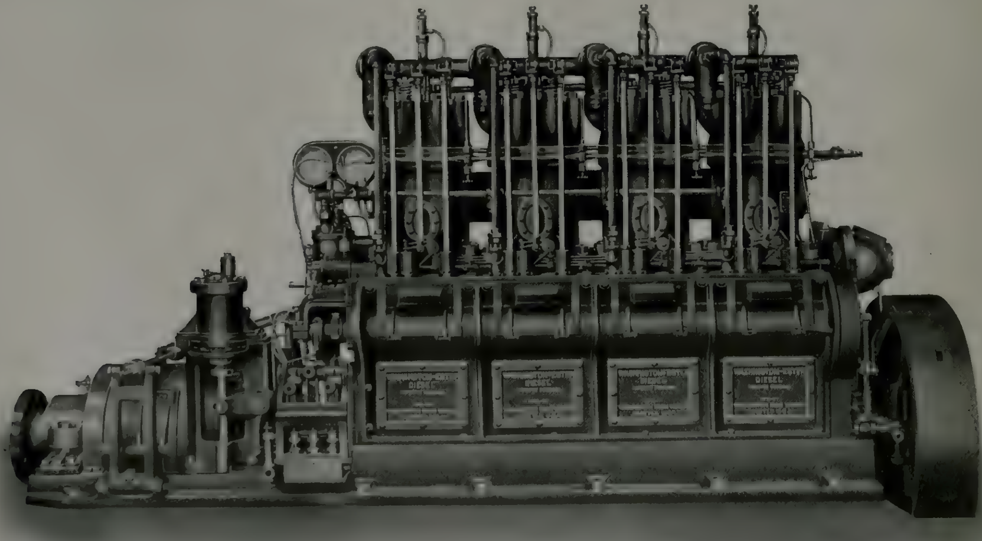
THE Washington Iron Works of Seattle, manufacturers of the Washington-Estep diesel engine, have arranged with the firm of W. H. Worden Company, Inc., San Francisco, to act as agents for the engine in California. Selection of this firm follows a long connection between the two companies, as the Washington Iron Works products have been handled by the W. H. Worden Company for the past thirteen years. Logging engines, saw mill machinery, steel cable, hauling gear, and leaders, are some of the various products dealt in. In fact, all kinds of tools and appliances used in logging, quarrying, and construction work are obtainable at W. H. Worden Company's stores and warehouse.

The selection of this firm to handle the new Washington-Estep diesel in California is therefore logical. And perhaps no better arrangement could have been made. The organization in San Francisco was started fifteen years ago by W. H. Worden, president. At that time the invested capital was principally ambition and integrity, combined with a knowledge of the selling and handling of lumbering equipment. Associated with Mr. Worden is George L. Edmondson, vice-president, and J. L. Williams, secretary. All these young men are natives of California. By strict business principles they have gained for the company a position in the business world which is enviable. Their intention is to still further merit the confidence of their customers. Adding the distribution of the new diesel to their stock will be of material advantage to buyers, for now the prime mover as well as all other equipment can be purchased from a single house. That this is of value is obvious.

Besides just selling units of these engines, a complete line of spares will be stocked. That a prospective customer may better be able to see what he buys, a working unit of 100 horsepower will be installed in the W. H. Worden Company's warehouse,

Washington-Estep

Above: W. H. Worden, president of W. H. Worden Company, Inc., California agents for the Washington Iron Works, Seattle. Below, a 4-cylinder marine type Washington-Estep full diesel engine.



in charge of a factory representative. This machine will be in operation doing real work and so arranged that loads of different sorts can be thrown on and off at will. Explanations of the salient points of interest and advantage will be explained, and thus a very clear idea of the engine may be had.

A full description of this engine appeared in the January issue of Pacific Marine Review. As stated there, it is of the 4-cycle, solid-injection type, and has shown excellent maintenance records and done splendid service with a minimum consumption of fuel. Units of from 50 to 800 horsepower are manufactured suitable for workboats, as the method of remote control is one that is simple while at the same time positive. An engine of this character and reputation, with a selling organization of the type of W. H. Worden Co. behind it, will no doubt be installed in many California workboats.

To have at the service of customers the highest available skill in installations and the best mechanical advice, Joseph F. Gisler has been retained by the W. H. Worden Company as their mechanical engineer. Mr. Gisler is well qualified to fill this position, through his wide and varied experience. For many years he was with the United Engineering ing Company, the Worthington Pump Corporation, and others. During the late war Mr. Gisler had direct charge of the construction of 264 Yarrow boilers for the sixty-six destroyers built at the Bethlehem Shipbuilding Corporation's Union Plant, San Francisco. At this work Mr. Gisler proved his remarkable ability as a finished mechanic and executive, backed by a thorough theoretical knowledge. His experience with diesel engines has been extensive, he having been consulting engineer for the Golden Gate Ferry Company when that concern was pioneering in diesel-electric drive for ferryboats. He is a practical marine engineer, holding highest certificates for both steam and diesel operation, and is a member of the American Society of Mechanical Engineers. He, like the other principles of the firm, is a Californian.

With an organization such as outlined above, it is evident that the W. H. Worden Company will maintain their past record for good business dealings and satisfactory service to customers. Certainly the new diesel from the North will enter the field in California under splendid auspices. The field for diesel engines in California is wide and the opportunities are many. Besides the marine field, for which the diesel is especially adapted, there is a vast potential market ashore for good stationary diesel engines, as their uses are many. Mines, logging, pumping, electrical generation, and all kinds and forms of power application can be handled by the diesel engine, which is fast superseding steam for these uses.

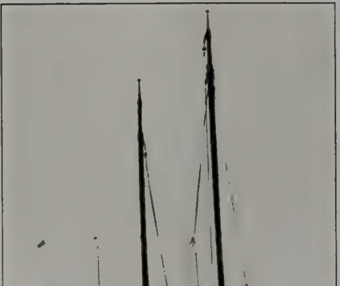
The Washington-Estep diesel engine in marine and stationary types is a product based on sound engineering principles and on modern shop practice. Its introduction to California users under the sponsorship of the W. H. Worden Company, Inc. should materially aid in the spread of the gospel of diesel fuel economy among the power users of the Golden State, both ashore and afloat.

With the Engine Building Shops of San Franciso Bay

MANUFACTURE and installation of internal combustion engines for workboat power plants keeps on apace, and the builders on San Francisco Bay get a fair share of the business, judging by returns from them.

Atlas-Imperial Engine Company booked orders during January for 49 diesels, aggregating 4440 horsepower, and 10 gas engines, with 150 horsepower. Points of destination of these were Panama, San Pedro, Alaska, Portland, British Columbia, Mexico, Astoria, Monterey, Tacoma, and San Francisco.

Western Machinery Company turned out two 110 horsepower Western-Enterprise diesels for Morgan Bros., to be used in two ex-subchasers, now engaged in the Mexican fishing trade; one 110 horsepower diesel for Peters Bros., Sausalito; one 80-horsepower engine for workboat Peterson No. 4, San Francisco; one 250-horsepower engine for the Union Oil Company; two 55-horsepower diesels for Captain Fred Christiansen's new river boat; one 80-horsepower engine for workboat Dolphin; and one 135-horsepower engine for the new boat for Wilder, name not yet given. Besides these several stationary jobs were turned out.

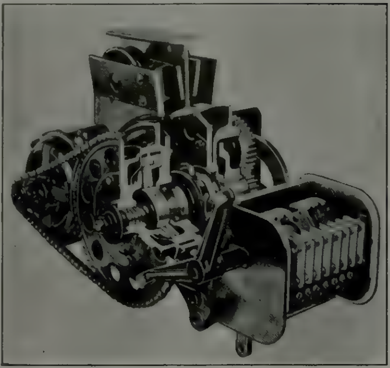


The auxiliary schooner Nanaura in Papeete harbor. Length, 60 feet, beam 12 feet, draft 5½ feet, powered with an Atlas-Imperial 50-horsepower full diesel engine. 8½ miles an hour on fuel consumption of two gallons an hour.

Hicks Engine Works have $40,000 worth of unfilled orders on their books, covering the popular smaller sizes of gas engines for fishing craft. The outlook is very good for future business, and the shops are fully employed. This firm is still carrying on its research and experimental work on their new diesel engine to be especially adapted for smaller fishing craft, and they expect a large business in this line to follow the completion of present designs.

Union Gas Engine Company has several marine jobs on hand, also stationary ones on the floor. Powers range from 70 to 280, and destinations cover a field reaching from the South Sea islands to Alaska.

New Electric Hoist



The new ball-bearing model 20B Yale & Towne electric chain hoist.

THE Yale & Towne Mfg. Co. of Stamford, Connecticut, has recently developed a new ball-bearing electric chain hoist known as Model 20B.

This hoist is the result of twenty years' experience in developing and building electric hoists of ¼ to 2-ton capacity. It embodies such features as close headroom, long lift, higher speed, automatic top and bottom limit stops and greater over-all strength. This hoist has very unusual factors of safety in the strength of the load-supporting members, and is designed to withstand shock loads so common to this class of equipment. All suspension members of the Yale Electric Chain Hoist are made of the highest quality steel.

The Yale Model 20B can be quickly adapted to any overhead system. The side plates of the trolley carriage can be spaced on steel bars to fit the desired beam flange.

Yale electrically welded steel chain can be furnished for varying lengths of lift. The centralized steel suspension means a constantly balanced load on the trolley wheels and hoisting unit irrespective of load position.

The mechanism is fully enclosed in oil-tight chambers and is compact and easily accessible for inpection without expert service. The ball-bearing load sheave, the latest Yale development, adds a big factor for low current consumption and general all-around hoisting efficiency.

Large chrome vanadium steel ball bearings surrounding the substantial steel load sheave reduce friction and make the Yale Model 20B electric chain hoist still more efficient, requiring a minimum amount of power and giving increased life.

The heavy steel one-piece load sheave, ground on an arbor to give perfect concentricity for the ball races, is bronze-bushed for the driving pinion, and splash lubrication provides a continuous flow of oil over all gears, pinions and bearings.

The driving pinion that passes through the load sheave is machined from a single drop forging, then heat-treated. The bearing surfaces on the shaft are ground to 1/1000 of an inch.

Steel chain containers can be furnished to hold any length of slack chain up to 60 ft. for ¼, ½, and 1-ton hoists and 30 ft. for the 2-ton hoist. These containers are secured to the under frame of the hoist and do not affect the headroom.

A New Light Weight Compressorless Diesel

FREDERIK VAN ROSSEN HOOGENDYK, M. M. E., has had a very complete and varied experience in diesel engineering both on the Pacific Coast and in Europe. As chief engineer for the Skandia Pacific Oil Engine Company, he had a large share in building the first large diesel engine produced on the Pacific Coast. Before that Mr. Van Hoogendyk was engaged with the Werkspoor factory in Amsterdam. When the builders of the new Colo diesel engine desired a man to handle their product on the Pacific Coast, Mr. Van Hoogendyk appeared to them to be the logical man. So the Colo starts on the Pacific Coast with a representative who certainly knows diesels.

As described in the February issue of Pacific Marine Review, the Colo diesel engine is a radical departure from the accepted type of small diesel. While a full diesel, it has features quite remarkable, as there is no air compressor for starting. This operation is easily accomplished by changing the position of the starting and running cams on the shaft, placing in the priming tube a spill of chemically impregnated paper, and giving the fly wheel a turn, the engine starting under a very low compression, and as soon as a turn or two is made thus, the cams for full compression are thrown in and the engine is off at full speed.

Recently a representative of Pacific Marine Review was priveleged to see the initial turning over of the first Colo diesel engine to arrive at San Francisco, and was struck with the readiness and ease of the starting operation. This makes the type desirable for light fishing boats. Arrangement of fuel pumps is good, and there is an individual pump for each cylinder. The cam shaft is driven by special spiral bevel gears, well and strongly made. The water circulating and bilge pumps are operated from the cam shaft and are so located that they can be easily disconnected for overhaul of valves, a very handy arrangement from the operator's viewpoint.

Weight is also a prime factor to be considered in diesel engines for small craft, and it might be mentioned that a 4-cylinder Colo of 32 horsepower weighs slightly over one ton. Compared with running expense for fuel, the cost is about one-third that of gasoline, and it has been estimated by the builders that a saving of over a thousand dollars a year on fuel alone can be made with a Colo with equal power as against gas. The first cost of the Colo is also low, as the builders have taken advantage of a tremendous plant and a stable and cheap labor market.

It is reported that there are over a thousand units under working conditions in Italy and Germany, although the engine has been on the market but a short time. To a mechanical engineer the smooth running and ease of manipulation appeal. Vibration is reduced to a minimum and the flexibility of the unit is notably high. The Colo, by reason of its light weight and other desirable features, will have a place on the smaller workboats that have in the past used expensive gasoline fuel. It is understood that a San Francisco firm is considering placing Colo diesel engines in two of their 35-foot workboats.

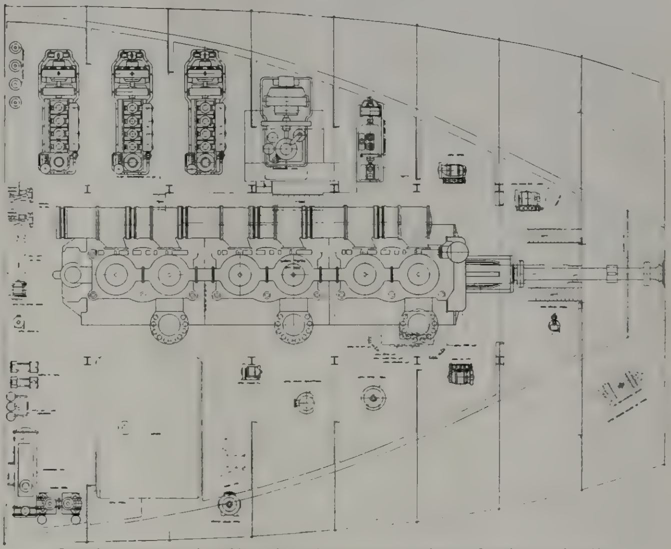
Marine Oil Engine and Motorship Progress

Bethlehem Converts Lio

The Potrero Works, Union Plant, Bethlehem Shipbuilding Corporation Build and Install, for the General Petroleum Corporation in the Tanker Lio, Largest Diesel Engine Built on Pacific Coast

THE motor tanker Lio was built by the Baltimore Shipbuilding & Drydock Company in 1921 for the account of the United States Shipping Board and was fitted originally with three Scotch boilers and geared cross compound Parsons turbines of 2800 shaft horsepower. Following are the particulars of the vessel.

Length over-all	450'0"
Length between perpendiculars	430'0"
Beam, moulded	59'0"
Depth, moulded	33'3"
Draft, loaded, summer	25'4½"
Block coefficient, loaded	.802
Net register tons	4,398
Gross tons	7,245
Deadweight, tons	10,250
Displacement, loaded, tons	14,760
Capacity, main cargo tank, bbls.	72,670
Capacity of Summer tank, bbls.	10,476
Capacity of dry cargo, cu. ft.	35,883
Fresh water, tons	255
Capacity fuel oil, tons	964

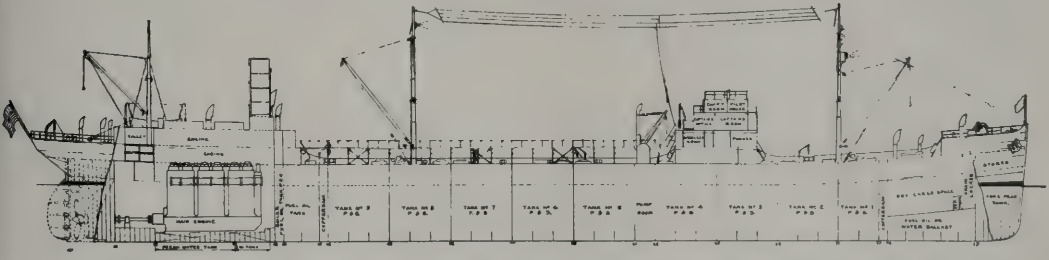


General arrangement of machinery in engine room of the General Petroleum tanker Lio.

The vessel was purchased by the General Petroleum Corporation of Los Angeles from the United States Shipping Board under the diesel conversion plan and the contract for making the conversion was awarded to the Bethlehem Shipbuilding Corporation's Union Plant at San Francisco.

In the conversion plan it was decided to retail one boiler for operating the cargo pumps and winches. This arrangement was considered the most economical and practical, as the ship is intended to carry refined oil and gasoline from San Pedro to Great Britain, and in this trade will discharge only about five cargos per year; so the expense of converting the cargo pumps to electric drive, with all the attendant changes, was not considered justifiable. Further, if the cargo pumps were converted it would be necessary to install the motors in separate gas-tight compartments, properly ventilated, to prevent the possibility of accident through sparking in the pump room with the possible presence of gas.

Another reason for this step was the custom prevalent in London in connection with the discharging of gasoline or refined oil where the port authorities do not allow the vessel to provide the power to discharge its own cargo. Neither boilers nor motors are permitted to operate for this purpose, but steam is furnished from shore to operate the cargo pumps while the ship is discharging cargo.



Inboard profile of General Petroleum tanker Lio, showing Bethlehem engine installed in the space formerly occupied by steam engine and boilers.

Main Engine.

The main engine is a 2900 brake horsepower Bethlehem 6-cylinder, 2-cycle, single acting air injection diesel - engine with cylinders 27 inches in diameter by 60-inch stroke, and develops its full power at 85 revolutions per minute. The cylinders are arranged in pairs so that the bedplate and housing for each pair of cylinders form one unit. The cam shaft, which carries only one set of cams for each cylinder, is operated through bevel gears from the after end of the crankshaft.

Reversing is accomplished by turning the cam shaft the required number of degrees to set the cams for astern operation and allowing it to revolve with this setting until it is desired to again reverse the direction of motion. This obviates the necessity of having two sets of cams, raising the cam rollers, and moving the cam shaft laterally to engage the rollers when the reverse motion is desired.

Air Compressor.

The three stage air compressor is arranged at the forward end of the engine and is driven by an overhung crank bolted to the crank shaft flange forward of No. 1 bearing.

Scavenging Pumps.

The three scavenging air pumps are inclined against the back of Nos. 2, 4, and 6 cylinders and are operated by connecting rods attached to the power cylinder connecting rods near the lower T end. The cylinders are scavenged by the Bethlehem single top valve method. The fuel valve is fitted in the center of the scavenging valve.

Cylinder Liners.

The cylinder liners are of the Bethlehem "bottleneck" type, which has the advantage of permitting a large space for cooling and free expansion where the heat of combustion is most intense. Exhaust ports are fitted around the entire circumference of the cylinder liners, and exhaust collectors are fitted to the outside of the liners, connecting to the main exhaust header.

Bedplate and Crankshaft.

Bedplate and cylinder liner supports are of cast steel, while the balance of the major and detailed castings are of cast iron. The bedplate is bored to receive round cast iron main bearing shells lined with white metal. The crank shaft, which is of forged steel of the built-up type in three sections, is 21 inches in diameter. The cranks on each section are set on opposite centers and the sequance is so arranged that the crank angles are all 60 degrees apart.

Thrust.

The Kingsbury thrust is carried in a special cast steel housing secured to the after end of the main engine bedplate.

Attached Pumps.

Five attached pumps are operated by the main engine. These pumps are of the double acting piston type operated by an overhead crank which is driven through a claw clutch from the after end of the main engine crank shaft. The pumps so operated are: circulating pump, lubricating oil pump, bilge pump, sanitary pump, and fuel oil supply pump. This method allows the vessel to be operated at sea with but few auxiliary units in operation.

One Bethlehem diesel-Westinghouse generator auxiliary set, for supplying light and power current and the steering gear, ice machine, fresh water pump, and fuel oil transfer pump (all motor driven) are the only additional auxiliaries required to operate at sea.

Auxiliaries.

The following motor driven auxiliaries have been installed:

1 Bethlehem-Weir vertical upright circulating pump.

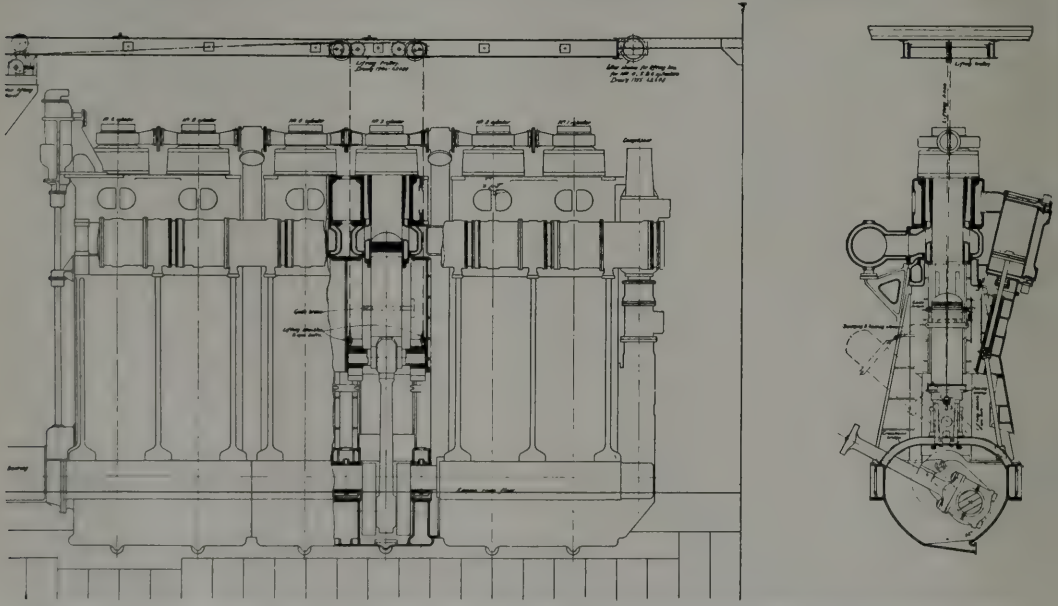
1 Bethlehem-Weir vertical plunger lubricating pump.

1 Bethlehem-Weir vertical centrex fire and bilge pump.

1 Bethlehem-Weir vertical plunger fuel oil supply pump.

1 Bethlehem-Weir vertical centrex sanitary pump.

1 Bethlehem-Weir vertical cen-



Longitudinal, transverse, sectional elevations of the Bethlehem diesel engine installed in the tanker Lio, showing method of removfng pistons for inspection.

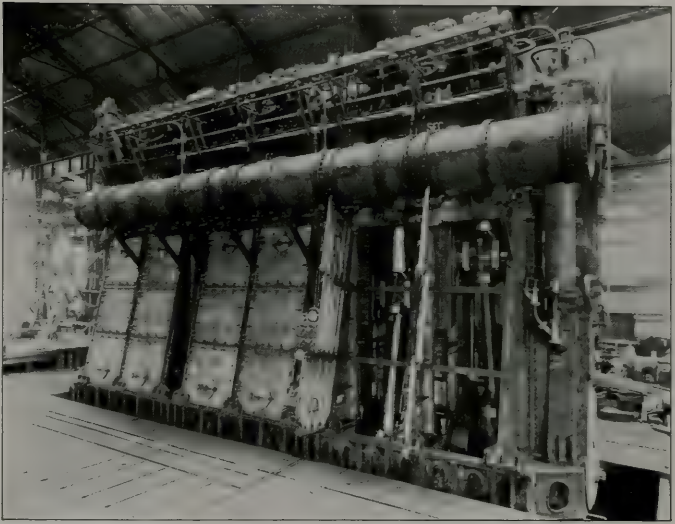
trex fresh water pump.
1 Bethlehem-Weir vertical plunger oil transfer pump.
1 Bethlehem-Weir vertical plunger boiler feed pump.
1 horizontal plunger piston cooling pump.
1 horizontal centrifugal sanitary pump.
2 horizontal plunger fuel handling pumps.
1 Bethlehem-Weir 3-stage auxiliary starting air compressor.
3 Bethlehem diesel - Westinghouse generating sets, 100-BHP. each.
1 Bethlehem hydro-electric steering engine.
2 Sharples fuel oil separators.
1 Sharples lubricating oil separator.
1 15-BHP. Mianus diesel generator and emergency air compressor.
1 2-ton Brunswick motor driven refrigerator.
1 motor driven warping winch.
1 motor driven anchor windlass.

Of the old steam plant there remains the following.

1 main boiler.
1 feed pump.
1 feed water heater.
2 steam driven cargo pumps.
1 injector.
1 auxiliary condensor and pump for same.
2 fuel oil pumps.
4 steam driven cargo winches.

One remarkable thing which impressed us during our inspection of this ship was the fact that not only is the main engine a product of the Bethlehem Shipbuilding Corporation, but almost all the auxiliaries as well bear the mark of this firm, and it is but a proof of the variety of marine products manufactured by them. Of particular interest are all the motor driven pumps, which are of the vertical type and therefore occupy small floor space, which is a valuable asset in any vessel and particularly in an oil tanker where the machinery is placed aft and space must be conserved.

As a steamer fitted with gear turbines, the vessel would require 16,000 barrels of fuel oil to make the round trip from San Pedro to London; and as a motorship she will require only 6200 barrels to make the same voyage—thus saving the cost of almost 10,000 barrels of oil for fuel on one trip. An equivalent amount of gasoline can now be carried in the form of cargo and delivered at London, adding materially to the gross revenue for the trip.



The Bethlehem diesel engine, 2900 brake horsepower, for tanker Lio, as erected in the shop at the Potrero Works. Covers of two frames open showing ease of access to reciprocating parts.

Not only is the vessel fitted with the most economical and modern devices in the engine room, but navigating and fire protection devices of the most recent types have also been installed. In this connection may be mentioned the "Metal Mike" and the Kolster position finder. Lux fire extinguishing apparatus has been fitted to all tanks.

The steering gear, which is a 12-inch Bethlehem hydro-electric gear operated by the original telemotor from the pilot house, can be operated in several different ways. In addition to the telemotor, the steering engine can be controlled by the "Metal Mike" from the pilot house. One steering wheel is fitted on the poop deck for operating the engine and a wheel is also fitted at the steering engine. Provision is also made, in the event of failure of any part of the steering gear, to throw out the engine and steer by hand. Relieving tackles are also fitted which can be taken to the electric mooring winch on deck and operate the rudder in this way.

The quarters on the vessel have been completely reconstructed and rearranged so it can now be stated that this is the most modern tanker in operation. Everything around the midship house and officers' quarters is beautifully fitted out and the utmost consideration has been given the comfort of the officers and crew. The day tanks are located on the main deck level immediately forward of the engine room. One of the small motor driven fuel oil handling pumps is connected to draw fuel oil from the settling tanks and discharge to the Sharples purifier, whence it is delivered to a small sump tank. The other handling pump is arranged to draw from the fuel sump tank and discharge to the day tanks. The fuel oil supply pump on the engine will draw from the day tanks and discharge into the suction chamber of the main engine fuel pump, located on top of the engine and operated by eccentrics mounted on the main cam shaft. This method of handling the fuel insures a constant oil pressure under the suction valves of the pressure pumps regardless of the oil level in the daily service tanks.

Lubricating Sump Pump.

A large trunk type lubricating oil sump pump operated by an eccentric mounted on the line shaft draws the lubricating oil from the crank base and discharges to a cylindrical sump tank located against the ship's side. The lubricating oil pump draws from the sump tank through specially designed twin strainers and discharges into the main lubricating oil header through oil coolers arranged in duplicate. Cooling water for these coolers is taken from the main engine circulating system.

The Port of Long Beach, California

Harbor Improvements Involving Many Millions Being Rapidly Pushed to Completion

APPROXIMATELY twenty years ago a private corporation obtained a permit from the United States government for the development of a private harbor at Long Beach, California, adjacent to the mouth of the Los Angeles River, and easterly of the harbors of Wilmington and San Pedro, California, which at that time were already on an operating basis and had been improved by private capital and government aid.

The improvement program initiated by this corporation consisted of the dredging of interior channels, a turning basin, a channel connecting Long Beach harbor with Wilmington harbor, and the dredging of an entrance channel, protected by parallel jetties, which provided direct communication with the deep water of San Pedro Bay.

However, as the Los Angeles River, which now discharges into the Los Angeles county flood control channel, at that time emptied directly into the harbor and as at each flood stage of the river large quantities of silt were deposited in the channels and turning basin, the maintenance of suitable depths became such a burden that in 1917 the corporation deeded to the City of Long Beach all its rights and title to the navigable waterways which had been developed.

The City of Long Beach subsequently expended approximately half a million dollars in the dredging of the interior channels and turning basin and for the dredging and redredging of the entrance channel which latter, being cut through a sandy shore and protected by parallel jetties not provided with suitable cores, shoaled rapidly after each redredging, and, following the period of the world war when the local harbor was more or less in active use due to the construction of vessels at the local shipyards, the entrance channel fell into comparative disuse and finally shoaled to such an extent as to be impassable for power or sail boats of any description.

In March 1924, following an active campaign, a bond issue totaling $5,000,000 for the improvement of the inner and outer harbors was carried by an almost unanimous vote, the ratio being 18 to 1 in fafor of the bond issue.

Working on the west mole, Long Beach Harbor.

Dredging Channel.

Contracts for dredging the channel connecting Long Beach harbor with Los Angeles harbor, channels 2 and 3, and the turning basis were immediately entered into and the first dredging was commenced in August 1924. The entire work, involving the removal of 6,519,055 cubic yards of material, was completed prior to December 1, 1925, the dredged material being utilized in the reclamation of land in both the inner and outer harbors.

Breakwater.

In July 1925 the City of Long Beach entered into a contract with the Hauser Construction Company for the construction of a rubble mound breakwater extending from the west bank of the Los Angeles County flood control channel for a distance of approximately 7000 feet into San Pedro Bay in such a manner as to protect the entrance to Long Beach harbor from the relatively severe storms which, although of rare occurrence, come from the south and southeast. In this same contract was also included the construction of two rubble mound moles, one on either side of the entrance jetties, laid out so as to form a modified arrowhead stilling basin, the seaward ends of which terminate at the 25-foot contour line.

August 31 the delivery of rock for the west mole was commenced and up to January 1, 1926, a total of 74,966 tons had been delivered and placed on the mole. This work is being carried out by means of a single trestle extending to one side of the center line of the structure, the rock being dumped into place from flat cars by means of a small caterpillar steam shovel which travels along the decks of the flats, unloading the rock as the shovel moves ahead. A portion of the rock is also dumped from side dump cars. The trestle work for the west mole is completed.

The Union Pacific Railway Company has constructed a trestle across the Los Angeles County flood control channel and has laid tracks along the beach between the flood control and the harbor entrance for the delivery of rock to the east mole and to the breakwater. Work on the construction of the trestle and the delivery of stone for the east mole is now in progress. The total estimated quantity of rock required for the completion of the rubble mound structures is 1,624,000 tons.

Entrance Channel.

A contract was recently entered into for the redredging of the entrance channel to Long Beach harbor so as to provide direct communication for vessels with deep water in San Pedro Bay. This work is now in an advanced stage, and it is anticipated that this channel will be completed in the early spring of this year.

At the present writing the least depth of water in the inner harbor, exclusive of private slips, at the port of Long Beach is minus 32 feet at mean lower low water, while the maximum depth of minus 40 feet prevails in the turning basin and portions of channels Nos. 2 and 3.

The completion of the dredging of the entrance channel which, as stated above, will be completed within the next few months will provide two entrances to the harbor of Long Beach, one by way of San Pedro and Wilmington and the other, shorter and more direct, from San Pedro Bay to the inner harbor.

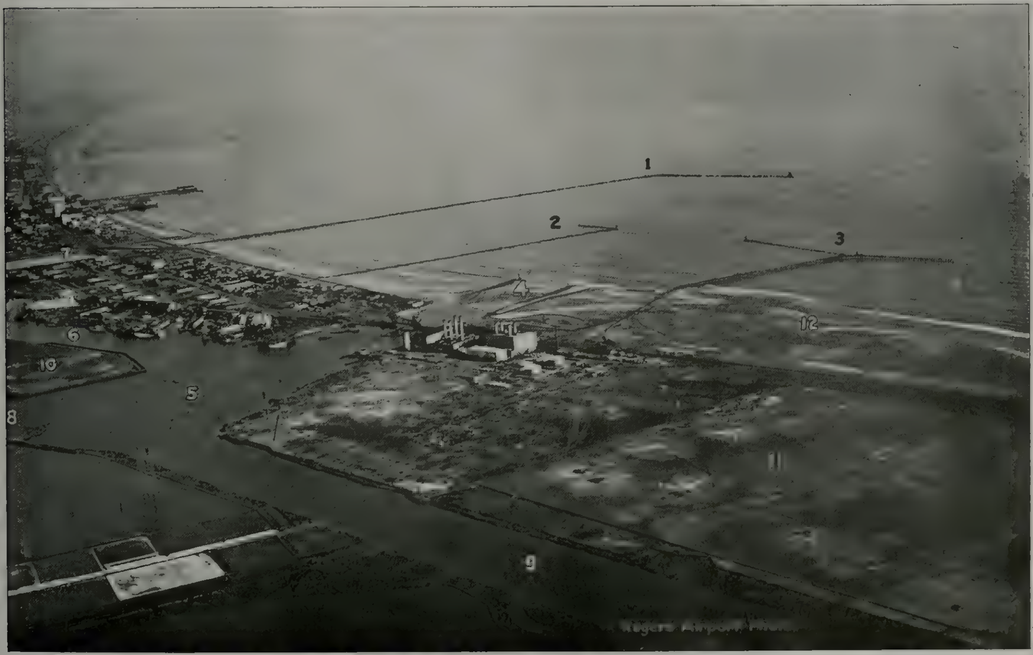
Westerly of the west mole approximately 200 acres of land have already been reclaimed through the depositing and retention of materials dredged from the channels of the inner harbor, the intention being to utilize this made land at a later date for the construction of highways, railways, and warehouses at the base of the piers which will be constructed into San Pedro Bay following the completion of the extension of the San Pedro breakwater as recommended by the Board of Engineers of the United States Army.

Utilizing the Long Beach breakwater as the easterly retaining wall, it is proposed to develop a solid fill mole 500 feet in width along this structure which will be provided with transit sheds and necessary transportation facilities for the accommodation of passenger and cargo vessels.

Inner Harbor Works.

Since the initiation of the harbor improvement program in 1924, construction in the inner harbor has been quite active. The improvements since August 1924, up to the present time, include the construction of approximately 4600 linear feet of bulkheading around the Southern Pacific-Dollar Line property on the Long Beach turning basin and channels Nos. 2 and 3; dredging of a slip on the northerly side of channel No. 2 and construction of cargo wharves thereon by J. H. Baxter & Co. the acquisition of approximately 5 acres of land by the Standard Gypsum Company on Slip No. 5 and the construction of a special cargo wharf for the handling of raw gypsum; the acquisition and improvement of approximately 1175 feet of frontage on channel No. 3 by the Richfield Oil Corporation where wharves and storage tanks for petroleum products are now in an advanced stage of completion.

In addition to these projects, which have already been completed or are well under way, an application to lease and improve city owned channel frontage on



Airplane view of the waterfront at Long Beach showing at 1. The breakwater; 2. the east mole; 3. west mole; 4. entrance channel to inner harbor, which channel is being dredged to 35 feet minimum depth; 5. turning basin; 6. Channel No. 3; 7, the Los Angeles County flood control channel; 8, channel No. 2; 9. channel connecting with Los Angeles harbor; 10. Southern Pacific Company terminal location; 11. filled land belonging to the Union Pacific Railway system; 12. reclaimed land of the City of Long Beach.—Rogers Airport Photo.

channel No. 3 with a cold storage warehouse and cargo wharves is now under consideration, while it is also proposed to reconstruct the present municipal wharf on channel No. 3 and slips 4 and 5 so as to provide an up to date terminal equipped with modern cargo handling machinery.

Trade Growing.

While the Port of Long Beach has been open to vessels of as much as 30-foot draft for scarcely more than thirty days, cargoes of crude oil, raw gypsum, and lumber are now either entering or leaving the harbor with increasing regularity and it is to be anticipated that projected improvements of waterfrontage will result in a steady increase in total tonnage handled through the port.

Meteorological and topographical conditions are unusually favorable for the development of the Long Beach harbor district, as storms and fogs are of rare occurrence, while the land available for industrial development is well above the high tide level and of ample extent to asure the accommodation of an almost unlimited number of industrial locations. Electrical power is plentiful and cheap while the oil fields at Signal Hill assure an abundance of fuel oil for steam generation.

The harbor is served by two transcontinental railway lines and one electric railway system and in addition is in communication with a broad and fertile hinterland through the medium of well paved highways over which heavy trucking may be carried on economically.

Port Improvement Notes

San Francisco. Port improvement plans to take care of the growing trade of the port will cost a total of approximately five million dollars, to be obtained through the sale of bonds already approved. The projected plans are as follows.

1. Construction of two new piers in the vicinity of Pier 50 at the south end of the present line of piers and so designed to allow berthing of the largest liners on the Pacific and to be equipped with the latest in marine equipment for the rapid handling of cargo.

2. Two other new piers at the northern end of the line of piers similar to the ones above outlined.

3. Extension of present piers to allow the berthing of two large vessels at the same time.

4. Reconstruction of Pier No.1 and equipping it with modern facilities for loading and discharging cargo.

The Harbor Board also has under consideration a consolidated ferry terminal at the foot of Hyde street to be used by the ferry lines running to Marin County.

David Nordstrom was awarded contract for the construction of two sheds on Pier 50 on a low bid of $142,765.

Monterey voters approved a bond issue in December of $262,000 to provide for the erection of a municipal pier and the construction of a causeway to the pier. Bids were opened on February 23.

Santa Barbara's City Council has accepted a donation from Major Max Fleishmann of $200,000, to pay half the cost of constructing a breakwater for a harbor, and ordered a bond election for $200,000 to match it.

Los Angeles Harbor. Arrangements were completed on February 4 for the entrance of the Santa Fe Railway into the Los Angeles harbor district. The railway line will have access to tide water over a temporary route and will accede to the Los Angeles Harbor Board desire for a unified Belt Line railway with the universal approach beneath the now building Dominguez Slough viaduct.

Bids were opened on February 17 by the Los Angeles Harbor Department for concrete and sheet piling for the new pier at Berth 228 D and E, to be 1000 feet long and 700 feet wide. This is to be the last of the Union Pacific terminal piers on Terminal Island.

Long Beach. The Terminal Warehouse and Cold Storage Company has leased 4.51 acres on Long Beach harbor channel No. 3 as a site for a terminal and warehouse to cost approximately $800,000. The progress of Long Beach outer harbor is described at length elsewhere in this issue of Pacific Marine Review.

Oakland. G. B. Hegardt, since 1912 chief engineer and secretary of the Port of Portland Docks has been appointed Port Manager of Oakland and will supervise the work of port improvements shortly to be started. The city of Oakland has approved a bond issue of $10,000,000 for port development. A. H. Abel, assistant engineer of the Portland Dock Commission, will be Mr. Hegardt's assistant at Oakland.

Portland is contemplating the construction of Pier C at terminal No. 1, and plans will probably be completed in a short time. Pier C is to be between the present pier B and Slip No. 2 on the north boundary of the terminal site. The proposed pier will be 569 feet long and 210 feet wide, with a shed about 500 feet long and 172 feet wide.

Port Orford. Edward Skog is organizing a company and intends building a cold storage plant for the use of halibut and other fishing schooners operating in that section.

Bellingham. Supt. H. G. Selby of the Chicago, Milwaukee & St. Paul Railway reports the company will soon begin the construction of a wharf at this port for its Bellingham-Seattle barges. It will be 1600 feet long and will be built on the site of the old Schooner wharf, and will cost about $10,000.

Longview. The Columbia river front at Longview presents an unusually busy dock construction scene with work under way on four docks and contract let for a fifth. Docks of the Crown-Willamette Paper Company and of the Star Sand & Gravel Company are nearing completion; the public port docks are scheduled for completion March 26; and the Washington dock, first landing place for oceangoing freighters, is being moved to make room for a hogged fuel dock for the Long-Bell Lumber Company. The contract award mentioned above was to the Olympic Construction Company for the erection of a second export dock of the Long-Bell Lumber Company.

The Weyerhaeuser Timber Company will let a contract the latter part of February or early in March for piling to be used in the construction of docks on the Columbia River front at Longview, which will serve the mill to be erected in Longview.

Seattle Port Commission, in preparation for the movement of Oriental cotton through that port, leased to Harry Leckenby Company space at Smith Cove Pier 40 for use in establishing a fumigating plant.

Nawiliwili, Kauai. The territorial government recently accepted the bid of the Hobby & Coney, Kauai contractors, for the construction of a retaining wall at Nawiliwili, Kauai. Bid was $291,750 for construction of a wall 8 feet wide on top and to extend 6 feet above mean low water. Contract will be signed as soon as the money is made available.

Honolulu. A channel is being dredged by the Hawaiian Dredging Co. from the main channel of the harbor to Kapalama basin. This channel will provide a temporary passage connecting the two waterways and is intended to ease conditions in the harbor during the pineapple rush. This is the first step in the development of this basin as an addition to Honolulu harbor.

Two public improvement bond issues are scheduled for Hawaii for 1926, one for April and one for October. Port improvement work to be accomplished when these funds become available include: Wharf and harbor improvements at Honolulu, including Kapalama Basin and construction of Pier 11, $510,000; wharf and harbor improvements at Hilo, Hawaii, $500,000; wharf and harbor improvements at Kahului Harbor, Maui, $350,000 and Hana Harbor, Maui, $60,000.

Philippine Islands. The Atlantic-Gulf, and Pacific Co. of Manila has a contract with the government to build a pier and harbor improvements at Pulupandan Negros to cost 750,000 pesos.

Hoquiam, Wash. All records for lumber shipments by water from the port of Grays Harbor were broken in 1925 with a total of 1,116,110,691 feet. This is 56,630,136 feet in excess of the 1924 figures, Grays Harbor's first billion feet total. Coastwise, Australia, South American west coast, South Africa and east coast of United States shipments showed substantial gains during the year, while slight decreases were noted in shipments to Hawaii, China, Japan, Mexico, Philippines, and east coast of South America. European shipments rose from nothing in 1924 to 3,911,204 feet in 1925.

California continued to be Grays Harbor's best lumber customer, with shipments amounting to 554,300,000 feet. Japan was next in line with 238,028,412 feet, and the east coast of the United States was third with 226,675,668 feet.

The record total marks the climax of four years of unprecedented shipping development on Grays Harbor. Cargo totals began to show marked growth in 1922, just after the port terminal was opened. In that year the shipments increased more than 300,000,000 feet and since then each year has seen a bigger total.

Looking down on the Port of Astoria, with the mouth of the Columbia River in the distance.

Mercurized Wood Preservative

THE International Compositions Company of 25 Broadway, New York, has been informed that the blocks of mercurized wood which they gave for testing purposes to the National Piling Committee in the early summer of 1923, and which were placed in various ports on the South Atlantic coast have "resisted attack under severe conditions."

The company now offers a concentrated solution which may be mixed with fuel oil at the rate of one gallon of solution to 39 gallons of fuel oil. The cost of the two would make the impregnating material around 10 cents a gallon, or considerably cheaper than creosote.

In view of various advantages possessed by this material over creosote, it is to be expected that it will gradually but surely displace the use of creosote as a wood preservative.

The agents for this material in California are C. G. Clinch & Company of San Francisco and San Pedro.

An urgent deficiency bill presented to the House for approval during February carried an appropriation of $7,674,000 for the Coast Guard, which would be alloted as follows: For reconditioning five 1000-ton destroyers to be transferred from the Navy to the Coast Guard, $600,000; for acquisition of 35 75-foot off shore patrol boats, $3,150,000; for 5 seaplanes, $150,000; balance for operating expenses.

The Port of Eureka, California.

Electric Freight System for Steamship Terminals

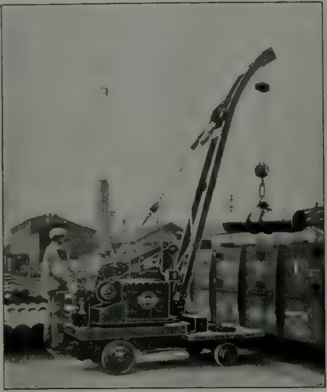
THE application of a system of industrial transportation to any warehouse or steamship terminal installation requires careful consideration of all the conditions and an intimate knowledge of the limitations and possibilities of the various truck models. The industrial truck salesmen must have this knowledge and the ability to quickly analyze conditions and solve them with the proper answer. No one has time, any more, for the man who knocks at the purchasing agent's door and asks "Are you buying any trucks today?"

There are two general systems which may be applied to warehouse installations, namely, the tractor and trailer or the load-carrying truck. This latter class embraces the utility truck, the elevating platform truck, and the crane truck.

The tractor and trailer installation seems to be best suited for large terminal warehouses where immense amounts of freight are carried for comparatively long distances. An installation of this sort will employ from four to ten or more tractors, and from three hundred to a thousand trailers. The empty trailers coming out of the inbound freight house or storage warehouse are dropped on the platforms alongside the freight cars to be unloaded. A crew of men at each freight car places the boxes, bales, or other freight on the trailers, and when there are enough to make a train a tractor comes along and picks them up, whisking them away to be either unloaded into storage space or on to drays for delivery.

In the outbound house a similar set of tractors and trailers carries the freight from the dray shed or the storage warehouse to the cars. The tractor drops its load and goes on to gather up some empties—it is always busy.

In many places it is becoming the practice to rent out portions of the warehouse to different manufacturing firms about the city. Materials or supplies are received in carload lots and stored here until required. In such installations the elevating platform type of truck presents a very convenient method of handling. The material is loaded right out of the cars onto wood skids. The elevating truck picks these skids up and deposits them in the storage space in the warehouse. The material while in storage is kept right on these skids. When the manufacturer is ready to use it, the elevating truck places the material, still on the skids, on the manufacturer's truck; then at the manufacturer's plant another elevating truck carries the material to its ultimate destination. In this way hand labor is absolutely eliminated from the time the material is unloaded from the cars until it is ready to be worked or used.



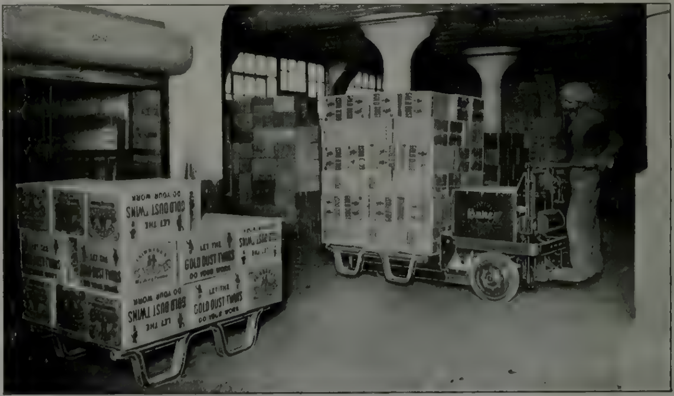
Baker crane type electric tractor.

There has recently been brought out a skid equipped with casters. These live skids are very handy for terminal installations, as such a skid can be loaded right in the box car and then easily pushed out to the platform by hand. Also, in cases where it is necessary to move the skids from one floor to another, the elevating truck can deposit the skids, one at a time, at the elevator. When the elevator arrives at this particular floor, the operator can easily push three or four skids onto his elevator, take them to the proper floor, and push them off again, where another elevating truck will pick them up and carry them to the proper place.

In some warehouses where heavy machines are stored a crane which will pick these up and carry them about is almost a necessity. Such a crane is shown in the accompanying photograph. This crane has a capacity of 3500 lbs., and with its 12-foot lift can also be used for stacking.

In the foregoing we have spoken of the industrial truck only as a substitute for hand labor; but there is another big point in its favor which is just as important now-a-days. The electric industrial truck offers the cheapest, as well as the most efficient handling method.

For the sake of comparison, take the straight load-carrying type truck, which is the least efficient of all the types. This truck will handle 4000 lbs. at a steady speed of 4½ miles an hour. It will make the return trip, empty, at 6 miles an hour, and will not sit down and rest between loads. A man with his hand truck will carry from 200 to 500 lbs. at less than half the speed, and must at times take a rest. Actually, he does only one-tenth as much work as the electric truck, while his wages are slightly more per day than the cost of operation of a truck. With tractor installations the percentage in favor of the electric equipment is greatly increased.



Baker platform lift type electric tructor spotting loads in a warehouse.

In some of the older warehouses conditions exist which prevent the use of electric trucks. Either the aisles are too narrow, or the floors are not in proper shape, or else the elevators have not sufficient capacity. In view of these difficulties, the owners must worry along with hand labor and all of its disadvantages. So it is important that any firms which are considering building new warehouses should impress upon their architects the necessity of so designing the buildings that the most modern handling systems may be installed. The most important points to consider are the aisles, the elevators, and the ramps. Main aisles should be at least 12 feet wide and the cross aisles 8 feet wide. This will give plenty of space for maneuvering the truck and for passing. Where elevating trucks are used, and it is not intended to move the truck itself from one floor to another, the elevator need only have sufficient capacity to take care of the load. This will depend upon the number of loaded skids which are to be handled at one time. Each skid with its load will weigh in the neighborhood of 4200 lbs. If the truck is to be lifted as well as its load, the elevator should have a capacity of at least 7500 lbs., and should be at least 8 feet or preferably 10 feet wide.

Where the tractor and trailer system is used, the ramp offers a convenient way of getting from one floor to another. However, it is quite important to see that these ramps are long enough so that the grade is not too steep. The limit of good practice is 15 percent, although some manufacturers make quite a point of the fact that their trucks can climb a grade of even 25 percent. This is all right as a stunt for advertising purposes, but for actual operation it is better to make the ramp twice as long and cut down the percent of grade by half. It is a fact that a truck going from one floor to another on a 25 per cent ramp will use 40 percent more current than if the ramp were twice as long and only 12½ percent grade. The reason for this is that all the trucks are equipped with the series motor which gives a large starting torque. It is a characteristic of this motor that the number of amperes drawn from the battery is proportional to the load put upon the motor, while the speed decreases with the load. For this reason a truck operating on a 25 percent grade uses twice as much current as a truck operating on a 12½ per cent grade. The reduced speed on the steeper grade is such that very nearly the same time is consumed in climbing the steeper grade, although it is only half as long. The small diagram herewith shows how the current consumption increases as compared to increase in grade. Up to 15 percent grade the proportion between the current consumed and the height climbed is within the limits of good practice, but grades above this figure are not recommended.

Interior view of the Kenna Terminals, Port Newark.

A Great Lumber Terminal at Newark

THE illustration on this page give some idea of the storage facilities and general internal appearance of the Kenna Terminal at Port Newark.

This great terminal, which specializes in the handling of building materials, is rapidly becoming one of the most important receiving points for Pacific Coast lumber on the Atlantic seaboard. Through the adequate handling facilities provided and the correlation of management and stevedoring personnel many very fine records have been made in the discharge of lumber at this terminal.

Steamer Robin Gray arrived December 29, departed January 9, cargo of 4,122,296 feet of lumber and 6000 bundles of lath. 382,000 board feet average discharge per day.

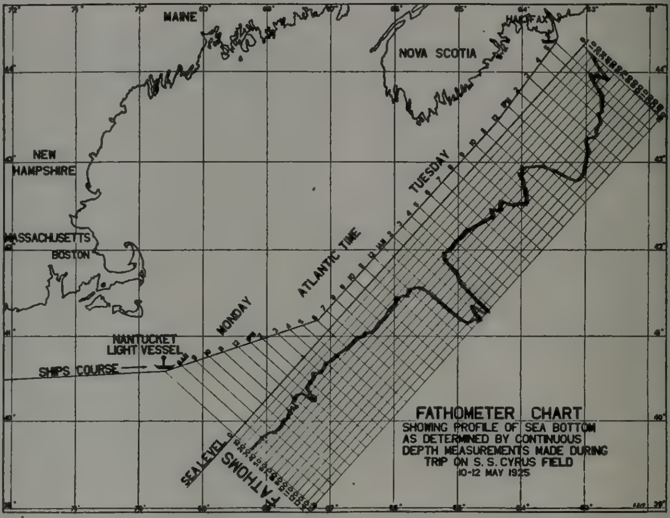
The greatest discharge ever afforded a steamer was accorded the steamer Felix Taussig at Kenna Terminal when it arrived on Wednesday, January 20, started to discharge at 8:00 A. M. Thursday morning, January 21, and completed her discharge at 3:00 P. M. Friday, January 22. In eight hours work 545,000 board feet were unloaded and by 3:00 P. M. Friday 525,000 feet more, making a total of a million and a half feet discharged in sixteen hours' work. This was accomplished in spite of the fact that it rained continuously on Thursday, and on Friday a terrific wind and light snowfall was a deterring factor in the unloading.

Wholesale lumber dealers are rapidly recognizing the value of such dispatch and the desirability of storage facilities afforded by modern well lighted and ventilated storerooms of the warehouses of this terminal.

The Isthmian Steamship Line is to have two boats in each month, the United American Lines three boats per month, and the entire eastbound tonnage of the Admiral Line is to be discharged at Kenna Terminal.

In the past six months over fifty million feet of West Coast fir has passed through this terminal, the largest terminal of its kind on the Atlantic seaboard.

Some Applications and Notable Tests of the Fathometer



THE Fathometer, a sonic depth sounding machine manufactured by the Submarine Signal Corporation, Boston, Massachusetts, was described in detail in an extended article published in the April 1925 issue of Pacific Marine Review. There was published with that description a chart showing the results of a survey made by the steamship Berkshire, in which continuous soundings were taken from a point off Nantucket to a point off Charleston, South Carolina. The soundings made at that time checked up remarkably with the soundings as given on the charts of the Coast and Geodetic Survey.

Since that article was written the Fathometer has been installed on a large number of vessels on the Atlantic, notable among these being the Leviathan, the Mauretania, and the Columbus. Vessels of the United States Coast and Geodetic Survey have also been equipped with this device, and one has been installed on the Western Union Telegraph Company's cable steamer Cyrus Field. A special trip was made with the latter steamer for the particular purpose of adjusting and observing the operation of the Fathometer equipment under the observation of officials of the Western Union Telegraph Company and of Dr. Herbert G. Dorsey and Mr. John Mullan of the Submarine Signal Corporation.

The Cyrus Field left New York on this trip on May 10, 1925, bound for Halifax. The chart reproduced herewith shows the results obtained by Fathometer soundings during this trip.

The Fathometer was operated almost continuously from the time of leaving New York until the arrival of the Cyrus Field at Halifax, running a total of 62 hours. All depths passed over were measured, from about 7 fathoms to 150 fathoms. The weather was foggy most of the way, making the course somewhat irregular, but it was plotted on charts by the ship's officers and many of the depths were read and recorded by them on the chart. They made several checks by the Kelvin depth machine which came within ¼ to 1 fatom of the Fathometer readings.

The trip demonstrated conclusively that the speed and accuracy with which the Fathometer indicates the depth of water beneath a moving ship is an invaluable aid in navigation.

Gas Engine Driven Arc Welding Sets

THE increasing use of electric arc welding for work on board ship, either in dock or in the harbor, structural steel work of various sorts, and general repair and construction, or job welding, has resulted in a demand for a source of welding current that is independent of local power limitations and that will furnish a reliable supply of energy at all times and in all places.

To meet this demand the General Electric Company, in cooperation with the Buda Company, manufacturers of internal combustion engines, has developed a gas engine driven arc welding set carefully designed to meet the exacting requirements of the service for which it is intended. The complete equipment consists of a WD-12 200-ampere self-excited arc welding generator with control, driven by a Buda model WTU 22½-horsepower four-cyinder heavy duty engine. The two are mounted as a unit on a completely welded structural steel base, which may be rendered portable by the addition of running gear. The dimensions of the complete set are: Length 87 inches, height 53 inches, and width 32 inches (13 inches should be added to the height for portable sets). Each set is furnished complete with the following accessories: 1 welder's hand shield, 1 electrode holder with 15 feet of extra flexible cable, 35 feet of extension cable, 50 feet of return cable, 1 ground plate, 1 steel wire scratch brush, and assorted sizes of metallic electrodes.

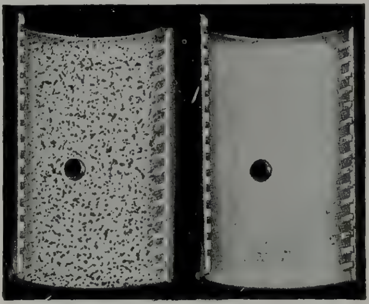
The WD-12 arc welding generator is a low voltage self-excited constant energy machine rated at 5 kilowatts, 25 volts, 200 amperes, 50-deg. continuous, with a very simple method of control. It has been specially designed for welding service which has requirements peculiar to itself. The fact that the generator is self-excited eliminates the trouble which may readily arise, especially in field work, from a separate source of excitation. It is designed with a high factor of safety and will give continuous service twenty-four hours a day with but little attention. The adjustment of the generator voltage, is readily changed to suit the character of the work. The amperage also can be exactly fixed to meet the requirements of the particular job in hand since there are an infinite number of steps available between the limits of 75 and 300 amperes. A self-adjusting reactor steadies the arc under any welding condition which may arise.

The generator is suitable for use with all sizes of electrodes from 1/16 to 1/4 inch diameter and can also be used for light carbon welding. It is especially adapted to supply power to General Electric automatic arc welders for continuous duty.

Mica As a Lubricant

YEARS of experimentation have brought forth Motor-Mica Anti-friction Lubricant (white) in powdered form. It is far superior to graphite, as it does not cake, gum, harden, or dry up, and it cools a hot bearing more efficiently and quicker than ice water.

By adding Motor-Mica to grease or oil, lubrication costs are cut to a minimum. It saves wear and tear on machinery, and also saves power and labor and delays occasioned by breakdowns due to bearing trouble. This is accomplished by filling up the tiny holes and pores existing in all bearings, giving them a mirror-like silvery finish that can not be obtained in any other way, thus practically eliminating friction.



Two views showing the surface of a bearing before and after the application of Motor-Mica.

Motor-Mica is a sensation among mechanical men. Manufacturing plants and engineers throughout the country, over 5000 of them, use it and praise it. It fills a long-felt need on steamships, and marine engineers cannot afford to be without it.

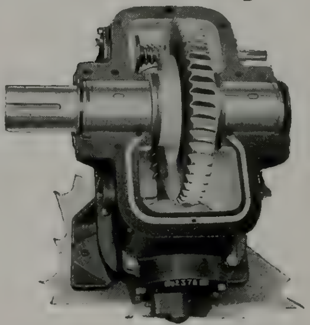
Tests made at Armour Institute of Technology show: "The effect of Motor-Mica is to reduce materially both the friction and the temperature. In test No. 1, in which a good quality grease was used without Motor-Mica, the temperature rose during the hour and a half from 152 degrees Fahrenheit to 189 degrees Fehrenheit, and the friction increased from 3.5 to 6.5 pounds.

"In test No. 2, in which Motor-Mica was used with same grade of grease and with all other conditions identical, no increase in temperature was noted. During the hour and a half the friction showed a small increase of ½ pound as compared with 3 pounds in test No. 1."

The manufacturer of Motor-Mica is so confident in the product as to offer to ships on aproval, not to be paid for unless entirely satisfactory, a 5, 10, 25, or 50-pound package. It is manufactured by the Scientific Lubricants Co., Chicago; Frank Moscow, originator and recognized authority on lubrication throughout the country.

This company also manufactures a complete line of high grade greases of various consistencies and for every use, already treated with Motor-Mica compound, which give ideal lubrication summer and winter. Motor-Mica self-feeding grease cups with Motor-Mica Self-Feeding Grease cannot be beat for real economy and proper lubrication.

Double Reduction Worm Gearing



A 2-stage reduction worm gear of the De Laval Steam Turbine Co.

WORM reduction gears, as recently developed for the driving of slow and moderate speed machinery by means of standard high speed electric motors, give speed reductions from 4 to 1 to as much as 100 to 1 in one step, with satisfactory efficiency; but for higher ratios, a one step worm gear would either require an inconveniently large wheel or else the teeth would be too small and weak.

For ratios above 100 to 1, as required for driving cooling tables, conveyors, stokers, heat treating furnaces, and escalators, it is therefore desirable to use two steps, with which the highest reduction ratios ordinarily required are readily attained. A two stage worm reduction gear has been developed by the De Laval Steam Turbine Co., of Trenton, New Jersey, for ratios up to 8000 to 1.

The one piece casing also acts as an oil reservoir, the oil being carried at such height that it touches the high speed wheel and the low speed worm at all times. In addition a positive oil pump draws oil from the reservoir and forces it through passages to the low speed shaft bearings. This is a valuable feature, as it is practically impossible, due to the low speed of this shaft, to lubricate the bearings satisfactory by splash. Suitable filling and drainage openings and oil cocks are provided for controlling the oil level. Escape of oil along the high speed worm shaft is prevented by a packed gland, while the seepage of oil along the low speed shaft is avoided by the use of an oil slinger working between the end of the bearing and an oil guard surrounding the shaft and held in grooves in the casing and cover.

Pioneering the Cutless Rubber Bearing

By DAVID W. DICKIE.

The tug Governor Stephens of the California Board of State Harbor Commissioners, San Francisco.

THE first marine installation of the Cutless rubber bearing came about in a very unusual way. A Mr. Keene met the writer and jokingly remarked that he had found a new device that I was not familiar with. Upon being informed that such a thing was possible but not probable he mentioned the Oliver Sherwood Cutless Rubber Bearing, and the joke was on me. However, I looked up every Mr. Sherwood until I found the correct one and started to investigate to see if someone could violate all the previous good engineering that we had been taught and get away with it.

The largest bearing I could find that was running was 1½ inch diameter and seemed to be giving a good account of itself, although it was reported that there were a few larger in operation. Mr. Sherwood at the time had no experience in marine matters and naturally was more optimistic than the situation called for.

I decided to try it and secured the permission of Mr. White, Chief Engineer of the Board of State Harbor Commissioners at San Francisco, to try it on the harbor tug Governor Stephens, then building to my specifications.

We removed the stern bearing, had a new stern bearing made, and vulcanized the rubber into it. The propeller shaft was 5 inches diameter and the bushing 5¾ inches where it ran on the rubber.

The first mistake was in the fit. Instead of giving the usual running fit for that size of shaft, say about five to six and one-half thousands clearance, the rubber bearing was made one and a half thousands small. Result was we could not get it on. It was then ground to a diameter fifteen thousands too large, or 5.765 inch, which enabled us to get it on.

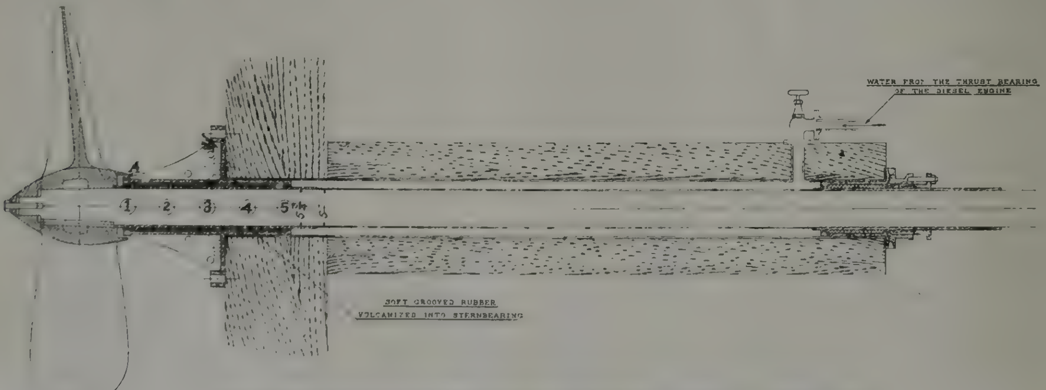
The day of the launching of the vessel came along and a well intentioned carpenter tightened up the stuffing box virtually air tight so very little if any water got into the stern tube.

The Enterprise Engine Company installed their 100 horsepower diesel engine, and when everything was ready to go the machinist in charge started up without loosening the stern bearing. The rubber bearing set up a fearful screaming indicating that it had been severely wounded. The vessel was taken to the drydock and the tailshaft drawn. We found that the rubber was rolled into little balls and the bearing totally ruined.

The lesson had been learned, however, and to avoid the possibility of lack of water in the future, a separate connection was fitted from the top of the sleeve log with a 1¼-inch lead pipe made tight at the lead sleeve and on top. A valve to close off the water was fitted on the sleeve log.

The water connection to the thrust bearing was tapped and led back to the sleeve log and the regular overboard discharge from the thrust bearing was fitted with a valve to close it off. The seats of both these valves were drilled to admit some water through in case both were closed at once by accident. This time we started off for the real trial.

It may be mentioned in passing that the weight of the shaft does


WATER FROM THE THRUST BEARING OF THE DIESEL ENGINE
A
1
2
3
4
5
SOFT GROOVED RUBBER VULCANIZED INTO STERNBEARING

Section through stern tube of the Governor Stephens showing method of application of the rubber bearing.

depress the rubber, and by calipering the space between the rope guard on the propeller and the stern bearing it was found that the space was 5/32 wider open on the bottom than on the top. When we had the stern bearing off to fix the rubber we turned the end down to allow more clearance at the space "A", as 5/64 inch of the space was taken up with the depression of the shaft into the rubber. This could be helped by grinding the hole eccentric if it were not for the fact that the rubber bearings are now fitted with shells which are slipped into the stern bearing and clamped. However, since the shaft depresses into the rubber 5/64 there is every reason to believe that with the motion of the vessel the shaft moves up and down 5/32 or twice this amount.

The rubber bearing was finally installed July 18, 1922, and had several superficial examinations in the meantime until October 17, 1924, when a new superintendent ordered it renewed.

Fortunately those of us who were watching discovered it in the shop and had it calipered at five different places, numbered on the sketch 1, 2, 3, 4, and 5.

Spot Number	Horizontal diameter	Vertical diameter	Difference
1	5.825 inch	5.917 inch	.092 inch
2	5.825 "	5.888 "	.063 "
3	5.795 "	5.875 "	.080 "
4	5.780 "	5.865 "	.085 "
5	5.765 "	5.853 "	.088 "

An examination of the table shows that the forward end of the bearing in the horizontal direction is exactly the same as the bearing was bored two years and three months before, while the after end was .060-inch larger.

We have no means of knowing whether this is due to wear on the after end or poor workmanship in making installation, that is getting the stern bearing slightly set over on the after end.

However, the difference between the horizontal and the vertical diameters should give a very good idea of the wear, especially where the bearing is the same as the measurement taken two years and three months before.

It will be noticed that the difference varies from .080 inch to .092 inch neglecting the .063 inch measurement, or from a little over 5/64 inch to nearly 6/64 inch.

In other words, the wear is at the rate of from .080 inch to .092 inch in twenty-seven months, and the total wear allowed for was ¼ inch or .250 inch. Putting this in tabular form—

Wear in 27 months	Wear in 12 months	Total Wear Allowed	Theoretical Life of bearing
.080 inch.	.0355 inch	.250 inch	6 Yrs. 0 Months 15 Days
.092 inch	.0409 inch	.250 inch	7 Yrs. 0 Months 15 Days

The service of towing piles from the pile boom where the water is shallow, the grit content of the water makes for short life of the stern bearings. This is especially true where there is considerable sand in the mud. In fact the babbitt or lignum vitae bearings last from three months to two years under the same conditions, depending upon the nature of the material carried in suspension in the water.

Some of the companies have fitted a special stuffing box at the stern bearing for the boats plying on certain reaches of the Sacramento River to keep the sand out; but they do not expect to get any such service as given above; in fact from six months to a year is considered good.

Another feature of the bearing is the marked decrease in vibration due to the propeller.

The Cutless rubber bearing is now manufactured by the Goodrich Rubber Company in sizes to suit any stern bearing and has been installed in many Pacific Coast pleasure and commercial craft and in vessels of the United States Navy.

New Juruick Refrigerating Unit

THE American Engineering Company of Philadelphia announces an improved self-contained refrigerating unit as an addition to the Juruick line. This unit, which is especially designed for automatic operation, includes a motor, compressor, condenser and amonia storage tank compactly mounted on one base and provided with all necessary controls. The unit is of 2-ton capacity. It will go through an ordinary door and can be located on any reasonably level floor without special foundations. Over-all dimensions are: length, 68 inches; width, 24½ inches; height, 45½ inches. It weighs about 1550 pounds.

This unit is especially adapted for use an shipboard, because of its compactness, ease of operation, and freedom from vibration.

The compressor is ruggedly built with the waterjacket cast integrally with the cylinder. The jacket is of simple capacity to cool the cylinder with a minimum of water. A-E Co. metallic packing is used in the stuffing box. This consists of a set of metallic rings and a ring of soft material. Each metallic ring has a spongy oil-absorbing core and is so constructed that it acts as a lubrication reservoir and oil seal against gas leakage. A by-pass valve makes it unnecessary to start against compression and prevents belt slippage, wear and overloads on the motor when starting.

A 3 to 5-horsepower alternating or direct current motor is used according to conditions. This motor drives the compressor by a belt running over an idler mounted on roller bearings. The condenser is of the shell tube type and is arranged so that it can be easily cleaned of scale and sediment.

With this new unit the entire process of refrigeration is controlled by a snap switch. A turn of the switch sets the machine for automatic operation. The control of this unit can be operated by hand if desired. The protective devices and automatic control devices include an automatic starting box, with device for cutting off the current in case of overload; thermostat for starting and stopping the machine as cooling conditions require; automatic water regulator operated by the ammonia pressure to control and conserve the flow of water through the condenser; low water safety stop, which automatically stops the machine in case of inadequate supply of condensing water and starts it again when the normal flow is resumed; and a high pressure stop to shut off the current from the motor in case the ammonia pressure mounts too high for any reason.

Thirty-five Years A Marine Engineer

HAD Albert O. Pegg taken up the study of law he probably would have made a fine record in that profession. Instead, he became an engineer, and besides becoming a splendid engineer, has made many improvements in the operation of steamships.

Back in the early 80's, young Pegg, a native of San Francisco, attended the public schools of that city. Passing through the elemental grades to high, he then completed his education at St. Ignatius College. At this time he began to have a keen thirst for mechanical knowledge. At St. Ignatius he majored in mechanical matters, graduating with high honors. From this institution he began his life work as an engineer, commencing at the bottom to learn the trade of marine machinist at the Union Iron Works. He was soon put into the department which at that time handled the Pacific Mail Steamship Company's work, a branch shop near the wharves attending to most of the light repairs. Here a fine opportunity to become familiar with many different types of engines and boilers was opened up. The subject was an absorbing one to young Pegg, and he soon became well versed in the business. Finishing his apprenticeship, he took service with the Pacific Mail Steamship Company, his first sea experience being on the old City of Pekin, under the late William McClure.

Obtaining his license as marine engineer, Mr. Pegg stood his first watch as such on the steamship Leelanaw, his first voyage in this vessel being one to Manila with a load of horses during the Spanish-American War. From this vessel he was transferred to the United States hospital ship Relief, operating around the Philippine Islands and China Sea, where he did good service for nearly two years. Returning to San Francisco he was transferred to the transport Logan, and was with this vessel during her reconstruction and outfitting at Mare Island.

Albert O. Pegg, superintending marine engineer, Union Oil Company of California.

Being offered a fine opening with the old Risdon Iron Works, Mr. Pegg went with that firm and was, with D. Dorward, in charge of the construction of the Mill Creek hydro electric pipe line. This project was at the time the highest headed water power line known. It delivered 7500 horsepower at a head of 2000 feet. After nearly a year of this work, and the line being completed, Mr. Pegg was connected with the installation and operation of the machinery of the ferry steamer Cazadero, continuing with it until the early part of 1903, when he joined the Union Oil Company as first assistant engineer of the tanker Whittier, while she was being built at the Union Iron Works. After some time on the Whittier, he was sent East to join the steamship Lansing as first assistant. The vessel sailed from New York with a cargo of 47 miles of 8-inch pipe and 1000 tons of dynamite, reaching San Francisco in July of 1906. In 1907 Mr. Pegg was promoted to the position of chief engineer of the company's steamer Santa Rita, and after five years' service in that vessel was made in 1912 assistant superintending engineer. In 1918 Mr. Pegg was promoted to the office of superintending engineer, which place he now holds.

Within the past few years he has evolved and developed a system of keeping records of costs of maintenance which is regarded as a marvel of simplicity, efficiency, and accuracy. Furthering this he has also worked out a system to be applied to tankers which will give all the units of any fleet an equal break in working for the efficiency pennant, regardless of the age or size of unit.

Mr. Pegg is an active member of the Society of Naval Architects and Marine Engineers, and technical adviser to Mr. Groundwater, a member of the American Marine Standards Committee. Since 1918 he has been a resident of Los Angeles, where his headquarters are in the Union Oil Company's building in that city. Here he directs the work of his department, which is obviously of considerable magnitude. Among the company's personnel Mr. Pegg is held in very high esteem, and from them much of the material detailed above was obtained.

Reproduction of an old photograph showing the officers of the Pacific Mail Steamship City of Pekin. Mr. Pegg is the fifth from the left.

Marine Insurance

Developments of the Month

By **CHARLES F. HOWELL, Contributing Editor**

SUMMARY

The Classification of Air Craft
Open or Floating Policies
Loading and Stability
Marine Hazards Committee
Stranding
Motorship Risks?
Strike Insurance
Wind Driven Rain a Sea Peril?
More Dock Hazards

READ AND LEARN

ONE of the most important statements ever made by the American Bureau of Shipping which fixes the classification of vessels in this country, was that given out at its annual meeting on January 25, when the announcement was made that the Bureau proposed to assume the classification of aircraft as well. This is a proposition that has been under consideration by the heads of the classification society for some while. The language of the announcement was as follows:

"As commercial aviation in the United States is now an assured industry, and one which undoubtedly will soon assume a prominent part in American transportation facilities, it is logical that this Bureau should look forward to becoming the classification society for the aircraft to be employed. Other national ship classification societies abroad have already entered this field of activity, in their respective countries. During the past year the American Bureau has retained the services of one of the leading American authorities on aircraft, Admiral David W. Taylor, former chief constructor of the navy. This step has been taken in order to be prepared to do our part in the development of this important industry, when its extension will warrant our participation."

Such a step greatly interests marine underwriters because of the disposition of many of them to undertake this promising field of insurance. Aircraft insurance has been more or less helter-skelter to date, which is to be expected in so untried a line of transportation, but an authoritative classification of airplanes should greatly help in smoothing out some of the difficulties.

At the Bureau's annual meeting President Stevenson Taylor retired, after ten years in office, to become chairman of the board of managers; and Vice-President C. A. McAllister was elected president to succeed him. These changes become effective March 1.

Open Policies

One of the most convenient methods of taking care of numerous shipments is for the merchant to make use of an "open policy." This device insures promptness in coverage and does away with the delay incident to securing individual insurance for each shipment. It is customary for the assured's broker to arrange the matter. The open policy is a blanket form of contract covering on all and any shipments the assured may have. It is drawn to comply with the peculiar needs of the shipper's trade. A schedule of rates is arranged to apply. In the main, there is declaration or application for insurance in much the same way as on the usual specific shipment, with the exception that, where business is facilitated in consequence, certificates are printed for the special use of the shipper. These he fills in, and his broker presents them to the underwriter for a binding signature; which process eliminates the application. Where imports are concerned, the owner of the goods usually requires no certificate, and the insurance is bound by the filing of an application.

One of the great advantages of the open policy is that the shipper is covered, even if he has forgotten to take out insurance, if he notifies the underwriters of the omission prior to a loss occurring. Again, the shipper is likely to get the advantage of slight concessions in the rates. An active and intelligent broker will see to it that the rate schedule of his assured is maintained at as low a level as prevailing conditions will permit.

Open policies may be issued for a definite or indefinite period of time, and will cover the assured with respect to all his shipments as described in the policy, within the named geographical limits. These policies usually have a limit of liability on any one risk, but the actual amounts on which premium is to be paid, while undetermined, are definitely controlled by the limit of liability and by the valuation clause.

As a matter of fact, the immense commercial transactions of our day would be impossible without the use of the open policy. If it were necessary to specifically insure in advance each individual shipment, international commerce would soon become hopelessly involved, as, in many instances, merchandise is shipped, and may even have arrived, before the assured is aware that property at his risk has been exposed to transportation perils.

The open policy is sometimes

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styled a "floating" policy; but it should never become confused with "blanket" policies, which are similar in nature but widely different in their mode of operation.

Safety In Ships

There can be no doubt that the succession of total losses, especially from fire, among our coastwise steamers during the past twelvemonth has greatly shaken the confidence of the public in the safety of passenger and cargo ships. It is no unusual thing to hear people say they do not care to risk their lives on such vessels. This, of course, is a condition which must be immediately changed. And to this end a great deal of anxious thought is being directed these days to better ships and better standards of stability and construction.

A great step forward was made in January when the American Marine Standards Committee—a Department of Commerce adjunct that has the hearty support of Secretary Hoover—approved the report of its special committee on Loading and Stability, which had been appointed by the Executive Board. Marine insurance was represented on this committee by S. D. McComb, the delegate of the Board of Underwriters of New York. After a year's hard work, these gentlemen submitted a scientific basis for determining ship stability. The executive board accepts the report and urges its general acceptance by the 400 or 500 members of the American Marine Standards Committee. It is highly probable that the membership will endorse it; and, in such a devoutly hoped-for consummation, we will have for the first time in the United States a standard basis for all ships—which is a very different thing from having to rely, as at present, upon the individual judgment of inspectors here, there, and everywhere.

Another drive at the same problem, but from a different angle, is being made by the Marine Hazards Committee of the National Fire Prevention Association, through the adoption of more rigid rules and regulations governing the construction of vessels. Preliminary plans for dealing with the subject have just been outlined in a comprehensive manner by the Marine Hazards Committee's sub-committee on Construction, of which President C. A. McAllister, of the American Bureau of Shipping, is chairman. Shipowners, shipbuilders, and marine underwriters will be invited to give their assistance in preparing an adequate code.

In this connection it is of interest to note the observations recently made by S. D. McComb, one of the leaders in the New York marine insurance market, anent the hazards of fires and strandings. He points out that a ship fire may be controlled if proper appliances for extinguishing it are available when it is first detected; but that left to get under way the peril is extreme. He maintains that the best way of preventing the total destruction of a ship in such circumstances is having it fitted with fire resisting bulkheads and decks. With such construction a fire getting headway in one compartment can nearly always be confined thereto. Many of our coastwise vessels are woefully lacking in this respect, having a wide open space from stem to stern 'tween decks; a fire starting there has a clear sweep. He believes that two items are absolutely necessary to correct prevailing bad conditions: 1, means of promptly knowing when and where a fire starts in any part of the ship, and means of promptly and effectually extinguishing that fire without loss of time even though it be in a place where no one can reach it; and, 2, adequately subdivided compartments with fire resisting bulkheads and decks to confine the fire to the compartment in which it starts.

On the subject of stranding Mr. McComb calls attention to the fact that many of our coastwise steamers have no double bottoms at all, and that most of the passenger steamers have a double bottom only under the engine and boiler space. These ships should be fitted with a double bottom from stem to stern, and one sufficiently strong to permit of an ordinary stranding without puncturing the tank top. Subdividing is advisable for confining either a fire or free water to one compartment, instead of being subject to fire sweeping through their entire length or being flooded and sunk if their skin is punctured.

Classiflying Motorships

So many factors enter into the classification of motorships that the problem is a most difficult one. However, the underwriting risks for the various types differ far more among each other than do those for the various types of steamers. Investigations of accidents and statistics of casualties lead to certain conclusions. An up-to-date steel vessel equipped with a 4-cycle diesel engine built by a first-class firm involves a smaller risk than does a modern steamer; but a wooden ship, especially if she be fairly old, equipped with a hot bulb motor, is one of the worst risks afloat. Leaks cause most of the losses sustained by such vessels, from the fact that their hulls are not fit to stand the strain exerted by the engines.

Insufficient engine power is regarded by most authorities as one of the most serious problems in motorship construction. Swedish

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underwriters and Swedish governmental agencies have gone very thoroughly into this question and are insisting upon a new formula regarding engine power. The Norske Veritas, a classification society, divides vessels into motor and auxiliary, respectively, basing the distinction fundamentally upon the engine power in proportion to gross tonnage. In 1916 the English Loadline Commission designated all sailing vessels as auxiliary, irrespective of the engine power. Whereupon, in order to get more favorable insurance conditions, shipowners reduced their rigging so that their vessels might be classed as motor vessels.

Perhaps the worst type of all is the "converted" ship—former sailing vessels, barges, etc., which have been fitted with motors—because their original construction did not contemplate the strains and hazards of motor power.

Insure Against Strikes

Many old lessons were learned anew during the recently adjusted shipping strike in Great Britain. Merchants realized to the full how important it is to have insurance protection against the consequences of such an upset to the orderly process of business. Strikes bring many a claim for the underwriters to settle, and some of them are so indirect as to scarcely be traceable to their proper source. Take, for example, goods insured "with average." They may have been loaded for a long time in a vessel held up by a strike, and when they are subsequently found to be damaged, upon discharge, the underwriters have to settle the loss despite the impossibility of discovering how much of the damage was due to a marine peril and how much to the delay in transit. Again, underwriters are often called upon to pay for fires occurring in vessels which were hung up in port and unable to unload on account of a strike, whereas had she been free to continue her voyage she might have been rid of the cargo in which the outbreak occurred. Still another strike hazard has to do with deterioration or damage done to cargo; the marine policy takes care of this, in many instances, when it is next to impossible to determine that it was not a marine peril but actually the strike which caused the injury.

Wind-driven Rain

It often becomes a very difficult thing for a court to determine just what was the responsible first cause of damage—what is known in admiralty law as the "proximate cause." This was demonstrated in a recent case tried before the United States District Court, N.D. of California, in admiralty, 8 Fed. Rep. (2d) 356. James Tyson et al. were the libelants, and the Union Insurance Society of Canton, Ltd., the respondent. The decision was unusual.

According to the libel, a quantity of rice in bags was shipped from San Francisco to Santiago. While being transhipped to barges in the harbor, a storm arose driving the waves and rain against the rice and damaging a large quantity of it. The issuance of a policy of insurance by the respondent was also charged in the libel.

By chemical analysis the respondent determined what part of the rice had been injured by sea water and offered to pay for that part. But the rain damage was excluded by the underwriters on the ground that fresh water does not constitute a peril of the sea. The question which the court had to decide was whether or not the damage was due to a sea peril.

So far as either judge or counsel could discover there is no parallel to this case in the law books and the question was, therefore, absolutely new. Accordingly the court decided that it must be resolved in accordance with general principles and the nearest authority bearing upon the subject. His Honor said: "It is conceded, of course, by everybody that damage by the wind or waves is among the perils of the sea. The question here is whether or not rain driven by the wind or waves is within the meaning of the phrase, because it is conceded that the rain would not have reached the rice if it had not been for the wind. It is certain that, if the wind drove the ship off her course and on a reef or bar, it would be within the phrase: so, equally, it would be within the phrase if the wind drove some foreign body against the ship and wrecked or damaged her."

It was finally decided that the last cause in the present case was the rain, yet the proximate cause within the meaning of the law was the wind, without whose agency the rain could not have reached the rice.

Galveston Dock Fire

About the middle of January, Galveston followed the example recently set by New Orleans and came through with an extensive dock fire. As to what caused it, they do not know yet. Four blocks of piers were destroyed, 23 to 26 inclusive. They were old and unimproved risks classed as "C," and were locally known as the Mallory Docks, because under lease to that company. They were of wooden construction and, in part at least, stood upon wooden piling. Floors and roofs were of wood, the latter covered with composition. The fire protection consisted of a private equipment of hose and hydrants,

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together with the city fire department and two or three tugs supplied with fire-fighting apparatus.

Marine underwriters will have to pay something like $250,000 eventually on account of this disaster.

From the standpoint of pier and dock fire protection, it is interesting to know that the adjoining Pier 27, detached only thirty feet and containing more than 14,000 bales of cotton, had recently been equipped with a modern system of fire protection for "BB" Class. This equipment, although not primarily intended for protection against exposure fires, operated satisfactorily and, in conjunction with effective work by the Galveston fire department, prevented the ignition of the pier.

* * *

Freights, Charters, Sales

February 16, 1926.

THE wheat market is still at 30/- to 31/3 without much demand, although Canada still has a large surplus to be sold.

The Japan lumber market is easier with parcel space $1.00 lower for squares and for March-April $10 to $10.50 might be done. New orders are scarce. This dropping market has affected Australia somewhat, but owing to the Australian wheat market being way down and the excess tonnage arriving in the market, owners are declining to fix Australian lumber.

The American intercoastal lumber market is also easier with space and cargoes at $14.50 to $15. The foreign intercoastal is at present covered by time chartered tonnage with the last rate fixture at $14.

The West Coast of South America rate has been firm at $13 to $13.50. This market, however, will no doubt feel some depression with the general decline of freights in other directions.

The following fixtures are reported for grain from the North Pacific to the United Kingdom Continent: British stmr. Carlton, Portland or Puget Sound, 31/3, option Vancouver 30/-, Feb. Balfour Guthrie & Co.; British stmr. Anglo Mexican, Portland or Puget Sound, 31/9, option Vancouver, 30/9; British stmr. Jersey City, Feb.; British ms. King Malcolm (new), Feb. Wm. Pymm, Jr.; British stmr. Newbrough, Portland or Puget Sound 31/6, option Vancouver 30/3, Feb. Strauss & Co.; British ms. Demerterton (new), 30/-, Mar. Balfour Guthrie & Co.; British stmr. Peterton, 30/3, Feb. Strauss & Co.; British stmr. Turkestan, 31/3, Mar. same charterers; British stmr. Trelissick, Mar. same charterers; British stmr. Benvrackie, Portland, 31/3, option Vancouver 30/-, Mar. Kerr Gifford & Co.; British stmr. Innerton, Portland or Puget Sound 32/-, option Vancouver 30/-, Feb. Strauss & Co.

The Japanese stmr. Ryujin Maru is reported fixed from British Columbia to Japan with wheat, Feb. loading, by Susuki & Co. and the Norwegian ms. Fernbank is reported fixed for the same business, Feb. loading, by Balfour Guthrie & Co.

The following steamers are reported for lumber to Australia: Norwegian stmr. Borgestad, North Pacific to Australia; Italian stmr. Ansaldo Settino, same, Mar.-Apr., W. L. Comyn & Co.; British stmr. Elsiston, Feb. J. J. Moore & Co. Inc.; American bktn. Forest Pride, prompt loading, Canada Trading Co.; British ms. Narenbank (new), Pacific Export Lumber Co.

The following fixtures are reported for lumber to the Orient: Japanese stmr. Malta Maru, Puget Sound and Grays Harbor to Japan, Jan. Nakagawa & Co.; Norwegian stmr. Hardanger, North Pacific to Japan, Feb.; Japanese stmr. Clyde Maru, Grays Harbor to Japan, Feb. Nakagawa & Co.; Japanese stmr. Erie Maru, Puget Sound to Japan, Feb. Yamashita & Co.; Japanese mr. Florida Maru, North Pacific to Japan, Feb./Mar. same charterers; Japanese stmr. Havre Maru, Puget Sound to Japan, Feb. same charterers; Japanese stmr. Tasmania Maru, British Columbia to Japan, Feb. Mitsui & Co.; British stmr. Atlantic City North Pacific to two ports Japan, lump sum, Feb. W. L. Comyn & Co.; British stmr. Madras City, Grays Harbor to Shanghai, Mar. Robert Dollar Company; British stmr. Skegness, Puget Sound to Japan, Mar. W. L. Comyn & Co.; Japanese stmr. Okuni Maru, Grays Harbor to Japan, Feb. Suzuki & Co.; American stmr. Missoula, Columbia River to two ports Japan, Mar. Columbia Pacific Shipping Co.

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American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work In Prospect

Coast Guard Cutter New Bear.

Plans and specifications have been issued by the United States Coast Guard, Washington, D. C. for a steel single-screw, diesel-electric vessel of special construction for Coast Guard duty in Alaskan waters and for cruises into the Arctic Ocean.

Specifications of the vessels are:

Length over-all	216'0"
Beam, molded	39'0"
Displacement, 15' mean draft, tons	2050
Shaft horsepower	1000

In sending out request for bids, the Coast Guard Service accentuated three conditions of construction; first, that the vessel must be completed on or before March 15; second, that the vessel is to be of special construction for her particular service, the frames to be of web construction throughout and the side shell plating from waterline to bilge average 1 inch in thickness; and third, bids will be considered only from firms who have had experience in the installation of the type of propelling machinery required and who have built oil tank vessels or vessels of similar type.

Bids will be opened March 2.

Plans Nearing Completion for Red D Steamer.

Bids will be asked the latter part of February or early in March for a steamer for the Red D Line, 82 Wall Street, New York. Plans are being prepared by Theodore Ferris, naval architect of New York.

Shipping Board to Open Bids for Diesel Engine Installations.

The Shipping Board has issued specifications and bids will be opened on February 18 for the installation of two sets of Busch-Sulzer diesel engines in two Shipping Board vessels. The yard making the installations will have the choice of two of the three vessels Seminole, Sawolka, and City of Bayville. The Busch-Sulzer engines are 2-cycle, single-acting, 3000 brake horsepower, manufactured by Busch-Sulzer Bros. Diesel Engine Co., St. Louis, Missouri.

Bids Called for Inter-Island Steamer.

Bids will be opened March 11, 1926, for a 400-foot twin screw passenger and freight steamship for the Inter-Island Steam Navigation Company of Honolulu. The boat was designed by Gibbs Brothers, New York, and will cost about $1,750,000.

Southern Pacific May Build.

The Southern Pacific Company Steamship Lines, Pier 49, North River, New York is said to be putting the final touches to plans and specifications for from one to three new passenger and freight ships for their Atlantic Coastwise Trade.

Work on Ward Line Vessels.

We have been advised that the New York & Cuba Mail Steamship Company (Ward Line) foot of Wall Street, New York, is contemplating the refrigeration of the steamships Orizaba and Siboney. This work, if carried out, will involve a total of close to half a million dollars.

The Erie Railroad, New York is reported to have under contemplation the building of a fleet of new barges, part of which will consist of derrick boats and part refrigerated.

Chile to Build New Naval Vessels.

Commander Don Calixto Rojers of the Chilean legation at Tokyo announced upon his arrival at Victoria, B. C., early in February that contracts for the construction of four new naval vessels will be let by the Chilean Government shortly.

New Diesel-Electric Yacht.

Henry J. Gielow, Inc., 23 West 43rd Street, New York, is preparing plans for a diesel-electric seagoing yacht to cost about $1,000,000. The yacht will be of the clipper bow type, will be 270 feet long, 40 feet beam, and 16 feet draft and will have propulsion equipment of 3000 horsepower.

Canadian Fishing Boats Designed.

Lee & Brinton, Seattle naval architects, have just completed plans for three seine boats for the Canadian Packing Corporation, Victoria, B. C. The vessels will be built by Yarrows, Ltd., Victoria, and will cost $100,000. The Canadian Pacific Packing Corp. has also let a contract for seven scows to the Turpel Marine Railway of Victoria.

Navy Asks Funds for Airplane Carriers.

The Navy Bureau of Aeronautics recommended to the House Naval Committee the appropriation of $50,000,000 for the construction of two new airplane carriers similar to the Saratoga and Lexington.

MOTOR TANK BARGE GENERAL

The latest oil tank barge to go into operation on San Francisco Bay is the diesel-electric tanker General. This vessel was completed in January by the Bethlehem Shipbuilding Corporation, Union plant, San Francisco, for the General Petroleum Corporation. She is 170 feet between perpendiculars, 32 feet beam, 11 feet 6 inches loaded draft, and is powered with two Atlas-Imperial diesel engines of 250 brake horsepower each, direct connected to two Westinghouse 250 volt direct current generators and electrically coupled with a 350 shaft horsepower double armature Westinghouse motor operating at 160 r.p.m.

The Katrina Luckenbach, intercoastal liner of the Luckenbach Steamship Co., recently equipped with Ray Burners.

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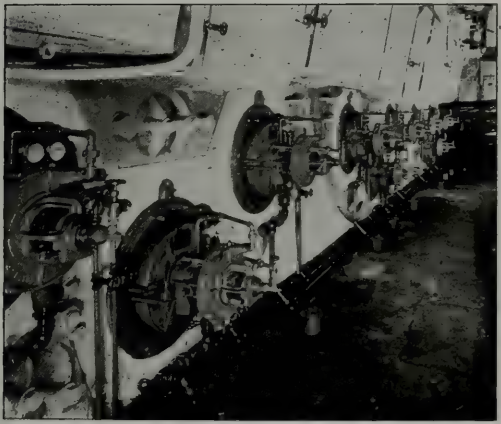

Installation of Ray Burners include a wide range of vessels—tankers, freighters and liners. The above view illustrates the Ray Burners in the fire room of the S. S. Glacier.

INSTALLED ON

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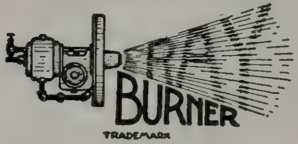

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Reconditioned Argentine Battleship Rivadavia

The Bethlehem Shipbuilding Corporation, Fore River Plant, Quincy, Massachusetts, has completed the reconditioning of the battleship Rivadavia of the Argentine Navy. The vessel arrived at the shipyard on September 9, 1924, and completed her machinery and gun firing trials on January 29, 1926.

The principal items of work consisted of:

Replacing old direct drive turbine installation with new turbines and reduction gears of modern design, the installation consisting of three sets of turbines and reduction gears, one set for each shaft, each set consisting of one high pressure and one law pressure turbine, the astern element being included in the low pressure turbine casing; designed horsepower 45,000 per ship or 15,000 per shaft.

Converting the eighteen Babcock & Wilcox boilers from coal to oil burning, each boiler being fitted with five fuel oil burners. Coal bunkers converted to fuel oil tanks having a capacity of 4200 tons of fuel oil.

Modifications were made to the ammunition hoists of the six 12-inch gun turrets.

A complete system of fire control for the guns was installed, also modern improvements to the gas ejecting system for the 12-inch guns to eliminate the possibility of back fire.

Installations were made of Sperry Gyro-compass and modern range finders. Many improvements were also made in the electrical installation.

The trials of the vessel were made under the direct supervision of the following Argentine Navy Officers: Rear Admiral Julian Irizar, president of the Argentine Naval Commission in the United States; Captain Engineer Estaban Ciarle; Lt. Commander G. D. Bustamante; Lt. Commander D. Casanova.

The vessel was in charge of Captain Felipe Fliess, assisted by Commander Erneste Norixe, executive officer, and Commander Gualterio Carminatti, chief engineer. The vessel since her arrival September, 1924, has remained in commission.

The results obtained on the various machinery and gun trials of this vessel exceeded the contract requirements and were highly satisfactory to both the Argentine Naval Commission and the contractor, and are an outstanding attainment of the American shipbuilding industry.

The trials and tests of the boilers, turbines, electrical and ordnance installations were in charge of the Argentine Naval Officials, and the vessel was operated by the Argentine officers and crew, assisted by the officials and engineers of the Fore River Plant.

Representatives of the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., present at the trials were: E. B. Hill, vice-president; S. W. Wakeman, general manager; H. E. Gould, general superintendent; J. E. Burkhart, chief engineer; Capt. J. I. Kemp, pilot. The United States Navy Department was represented by Commander T. H. Taylor of the First Naval District.

Nine Launchings

(Continued from Page 103)

will be organized headed by various engineers and production men at the yard. These groups will be shown the many recent developments at this great plant. To take up the slack which necessarily developed in shipbuilding after the war, the company has diversified its production and has established broad facilities for building and repairing coal cars, box cars, gondolas, automobile cars, and cabooses, and for rebuilding locomotives. It is building hydraulic racks and rack rakes for waterpower companies, turbines, and regulating gates for commercial concerns—as well as having completed the great turbines for Muscle Shoals.

Due to the importance of the occasion, the Governors of Virginia, West Virginia, North Carolina, and Maryland will receive special invitations. It is known that many visitors will journey from New York, Detroit, Philadelphia, Baltimore, as well as from points West and South. A noteworthy group of members of Congress and officials will come from Washington and many naval officers from Annapolis.

The committee assisting in the preparation for the launchings on March 20, is as follows:

J. N. Shannahan, chairman, President, Old Dominion Land Co. and President, Newport News Light & Water Company.

F. J. Gauntlett, Washington Representative, Aluminum Corporation of America.

S. W. Holt, State Senator, Merchant, and director of the First National Bank.

L. T. Jester, city editor of the Newport News Daily Press, the Newport News Times, and Herald.

G. W. Lineweaver, managing editor of the Norfolk Ledger Dispatch, and member of the Hampton Roads Port Commission.

L. U. Noland, president, the Noland Company, The Noland Steamship Company, and of the Virginia Engineering Company.

C. D. Porter, Vice-President and General Manager, Newport News & Hampton Railway, Gas and Electric Co., President, Newport News Chamber of Commerce.

Harry Reyner, merchant.

O. A. Reynolds, Secretary, Newport News Chamber of Commerce.

J. W. Robinson merchant and director of the First National Bank.

Meade T. Spicer, executive assistant to the President of the C. & O. Railway Company.

Major Oscar Westover, Commanding Officer, Langley Field, Virginia.

Repair Awards

On a bid of $110,000, the Bethlehem Shipbuilding Corporation, Union Plant, San Pedro, was awarded contract for overhauling the tank steamer Coalinga of the Union Oil Company, including work on hull, superstructure, and engines.

* * *

Victoria Machinery Depot Co., Victoria, B. C. has been awarded contract for repairs to the Canadian Coast Guard vessel Armentieres. The vessel went ashore and damage repairs will cost about $25,000.

* * *

Newport News Shipbuilding & Drydock Corp. has received contract for reconditioning the steamship America at a cost of about $400,000; and for repairs to the President Harding costing about $110,000.

* * *

Moore Dry Dock Company will build cofferdams around the deep tanks of the Shipping Board steamer Las Vegas on a bid of $14,963, with $2228 additional for drydocking and repairs.

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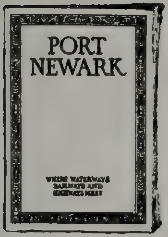

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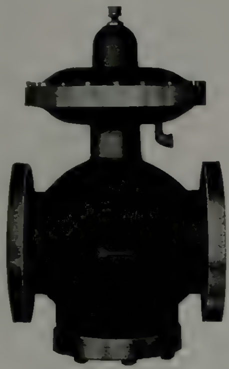

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In Pacific Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairs

Bids Submitted on Big Repair Job

Ten bids were received by the Shipping Board for work of repairing and reconditioning the freighter Derblay which went ashore in Ecuador while in the service of the General Steamship Company. The bids range from $68,980 to $79,100 and time from 35 to 45 days. They were as follows:

Los Angeles Shipbuilding & Drydock Corp.	$68,980
Bethlehem Shipbuilding & Drydock Corp.	71,360
Willamette Iron & Steel Works, Portland	73,150
Todd Dry Docks, Inc., Seattle	71,430
Albina Machinery & Iron Works, Portland	73,460
Albina Engine & Machine Works, Portland	74,120
Navy Yard, Bremerton	74,215
Commercial Iron Works, Portland	78,500
Helser Machine Works, Portland	78,900
Smith & Watson	79,100

The Derblay is now at the plant of Todd Dry Docks, Inc., Seattle.

Two Diesel-Electric Tugs Launched

The two diesel-electric tugs building by William Muller, Wilmington, California, for the Wilmington Transportation Company were launched on February 4. These are the first tugs of their type built on the Pacific Coast. They are each equipped with two Winton diesel engines of 300 horsepower connected to Westinghouse generators, which, operating at 450 revolutions a minute, will supply power to Westinghouse double armature type main propelling motors of 430 horsepower.

Bids on New Dredge

Shipyards on San Francisco Bay sumbitted bids in February for the construction of a dredge for the City of Oakland. Contract will be awarded in March. Following are the bids: Hanlon Drydock & Shipbuilding Co., $16,413; Moore Dry Dock Company, $17,367; Bethlehem Shipbuilding Corp., $17,787.

Union Oil Company of Canada to Build Tanker

The Union Oil Company of Canada, Ltd., Vancouver, B. C. has called for tenders for construction of a steel oil barge for use along the British Columbia coast. It will be about 90 feet long.

J. C. Johnson's shipyard, Port Blakely, Washington, has completed the motor tender Trojan for P. E. Harris & Co., Seattle. The tender is 85 feet long, and is the third they have built from the same plans during the last twelve months. The yard is now constructing a barge 90 by 32 feet for the Northwestern Fisheries Company, and will shortly lay keel for two fish scows for the Kadiak Fisheries Company.

Recent Contract

J. C. Johnson's Shipyard, Port Blakely, Wn., has order for three scows for the Northwestern Fisheries Co., Seattle. Two are to be 54 ft. long, the third 90 ft. long by 32 ft. wide.

Burrard Dry Dock Company, Ltd., North Vancouver, B. C., will shortly start construction of an oil tanker for the Imperial Oil Co., Ltd. to cost about $80,000, for coastwise service.

American Brown-Boveri Electric Corp., Camden, N. J., has an order for 25 coal barges for the Carnegie

WM. CORNFOOT, President GEO. RODGERS, Sec'y-Treas.

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In Atlantic Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairing

Steel Co. and six sand barges for Rodgers Sand Co.

American Boiler Works, Erie, Penn., has contract for six towboats for the Bureau of Canals, State of New York, Albany, N. Y., to be 40 ft. long, 10 ft. wide, and 5 ft. deep, and powered with gas engines.

Defoe Boat and Motor Works, Bay City, Mich., has order for a 44-ft. wooden yacht for Montgomery Whaling of Detroit, to be propelled by 200 horsepower engines.

Federal Shipbuilding & Drydock Company, Kearny, N. J., will build a motor tanker for the Gulf Refining Co.; 525 ft. between perpendiculars, 74 ft. beam, 28 ft. loaded draft; 11 knots speed, 17,400 tons deadweight, and 4500 indicated horsepower diesel engines.

This company also has an order for two lighters for Wm. Spencer & Son, 104 ft. 6 in. long, 32 ft. beam, and 10 ft. depth.

Great Lakes Engineering Works, River Rouge, Mich., has contract to build a 1500 cubic yards' capacity dump scow for the Great Lakes Dredge Co., Chicago.

Howard Shipyard & Dock Company, Jeffersonville, Ind., has order for a steam ferryboat for the Vicksburg & Delta Ferry Co., Vicksburg, Miss. The boat will be 104 ft. between perpendiculars, 32 ft. beam, 6 ft. depth, 3 ft. loaded draft, 10 mi. speed. Power will be supplied by straight high pressure steam engines and Scotch boilers. Keel will be laid about April 1.

This company also has an order from the Barrett Line, Cincinnati, for a steam towboat, 125 ft. between perpendiculars, 40 ft, beam, 6 ft. depth, 4 ft. loaded draft, powered with compound steam engines and Scotch boilers. Keel will be laid about April 15.

Keel Layings

Golden State, diesel-electric ferryboat for the Golden Gate Ferry Co., San Francisco, by General Engineering and Drydock Co., Alameda, Calif., Dec. 14.

Diesel-electric tank barge for Richfield Oil Company by Bethlehem Shipbuilding Corp., Union Plant, San Francisco, Jan. 9; tow barge, San Pedro plant, Jan. 9.

Wooden tugboat, diesel power, for Abernathy-Longhead Lumber Co. by Clyde Shipyards, Vancouver, B. C., Jan.

Wooden yacht for Geo. M. Kelly, Detroit, by Defoe Boat & Motor Works, Jan. 1; wooden yacht for T. B. Van Dorn, Cleveland, Jan. 1; wooden yacht for Hacker & Ferman, Detroit, Jan. 1; wooden yacht for John J. Barlum, Detriot, Jan. 18; wooden yacht for Montgomery Whaling, Detriot, Feb. 1.

Sternwheel towboat for The Ohio River Co. by Chas. Ward Engineering Works, Jan. 15.

Two steel barges for Kelly Axe & Tool Co., Jan. 11 and 15.

Savarona diesel yacht for R. M. Cadwalader by Newport News Shipbuilding & Drydock Co., Newport News, Va., Jan. 16; diesel yacht for Hugh J. Chisholm, Feb. 1; three house barges for Chesapeake & Ohio Railway, Jan. 16; carfloat for the Chesapeake & Ohio Railway, Jan. 30.

Launchings

Trojan, cannery tender for P. E. Harris & Co., Seattle, by J. C. Johnson's Shipyard, Port Blakely, Wn., Jan 5.

Silver King, yacht for Mrs. Etta Keith Eskridge, Los Angeles, by N. J. Blanchard Boat Co., Seattle, Jan. 19.

Kings Landing, towboat by Nashville Bridge Co., Jan. 14.

Chatham, combination passenger and freight steamer for the Merchants & Miners Transportation Co., Baltimore, by Newport News Shipbuilding & Drydock Co. Feb. 3.

Deliveries

General, diesel-electric tank barge for General Petroleum Corp. by Bethlehem Shipbuilding Corp., San Francisco, Jan. 8.

Dredge hull to Ellicott Machine Corp. by Bethlehem Shipbuilding Corp., Baltimore, Dec. 30.

Halcyon, automobile and passenger ferryboat for Walkerville & Detroit Ferry Co. by Great Lakes Engineering Works, River Rouge, Jan. 30.

Four carfloats to the Pennsylvania R. R. by Sun Shipbuilding Co., Dec. 7 and Feb. 2.

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Warehouse and Yard at Linnton, Ore.
Upper River Boom at Butteville, Oregon.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero, Works

Purchasing Agent: O. W. Streett.

General, hull 5327, diesel-electric tank barge for General Petroleum Corp.; 170 L.B.P.; 32 beam; 11-6 loaded draft; 9 mi. loaded speed: 920 D.W.T. 2 Atlas-Imperial diesel engs., 250 B. H. P. ea; keel Aug. 24/25; launched Oct. 28/25; **delivered Jan. 8/26.**

No name, diesel-electric self-propelled barge for Richfield Oil Co., 180′ 6″ L.B.P.; 32′ molded beam; 12′ molded draft. Atlas-Imperial diesel engs.; Westinghouse motors, capacity 7000 bbls. oil; **keel Jan. 9/26.**

San Pedro Works

No name,, oil barge, for Richfield Oil Co.; 131 L.B.P.: 40 molded beam; 11′ 6″ molded draft; capacity 7000 bbls. oil; **keel Jan. 9/26.**

GENERAL ENGINEERING AND DRY-DOCK CO.,

Alameda, Calif.

Golden State, hull 1, double-ended diesel-electric ferryboat for Golden Gate Ferry Co.; 240′ over-all; 44′ molded bam; 17′ molded dpth; Pacific Werkspoor diesel engs.; G.-E. generators; **keel Dec. 14/25;** launch Mar. 15/26 est.; deliver Apr. 15/26 est.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.,

San Pedro, Calif.

No name, hull 50, cabin cruiser for Don Lee; 140′ O.A.; 23′ 6″ beam; 9′ depth; 12.5 knots speed; 242 DWT.; diesel engs.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

Trojan, hull 47, cannery tender for P. E. Harris & Co., Seattle; 85 long x 18 6 draft x 10 depth; keel Nov. 9/25; **launched Jan. 5/26** deliver Feb. 1/26 est.

Uranus, hull 49, fish carrier boat for P. E. Harris & Co.; 36 ft. long; keel Nov. 16/25; launch and deliver Feb. 15/26 est.

Hull 60, one scow for Northwestern Fisheries Co., Seattle; 54ft. long.

Hull 61, one scow same as above.

Hull 62, one scow for Northwestern Fisheries Co., Seattle; 32 x 90 ft.

LAKE WASHINGTON SHIPYARDS

Kirkland, Wash.

Purchasing Agent: A. R. Van Sant.

No name, purse seiner, for stock, 65 L.B.P.; 15 beam; 8 loaded draft; engs. not determined; keel Oct. 28/25.

No name, purse seiner, same as above; keel Oct. 28/25.

No name, purse seiner, same as above; keel Oct. 28/25.

Cruiser for stock, 39 L.B.P.; 8-6 beam; keel Oct. 25/25.

NAVY YARD

Puget Sound

Holland, sumbarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng. 7000 IHP; two WT express type boilers; 10,000 tons disp; keel Apr11/21 deliver April1/26, est.

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Twelve barges, T. C. I. & Ry. Co., 140x25x9; deliver Jan/26, est.

One fueling scow for Ohio River Co., 90x26x8 feet.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

No name, hull 304, diesel tanker; 480 ft. long; 9500 gro tons; 13,000 DWT; New York-Werkspoor engs. 3200 BHP; keel May 25; launch spring 1926, est.

Hull 312, dredge hull, 140 ft long, for Bneyons Co.; keel Sept/25.

Hull No. 313, dredge hull for American Dredging Co., 135 long; keel Sept /25.

Hull 314, suction dredge for U.S. Engineers; 130′ long; keel Feb/26 est.

25 coal barges for Carnegie Stel Co.; 175x26x11 ft.

Six sand barges for Rodgers Sand Co., 135x27x 7′6″.

THE AMERICAN SHIPBUILDING COMPANY

Cleveland, Ohio

W. H. Gerhauser, vice-president and director of purchases.

No name, hull, 791, bulk freighter, Pickands, Mather & Co., 580 L.B.P.; 60 beam; 20 loaded draft; 13 mi speed; 12,000 D.W.T.; 2200 IHP., trip. exp. engs.; 3 B. & W. boilers; keel Oct10/25, est.

No name, hull 792, sister to above; keel Nov 10/25, est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT

Quincy, Mass.

Lexington, hull 1300, airplane-carrier U.S.N., launched Oct. 3/25.

No name, hull 1398, ferryboat for City of Boston, 172 L.B.P.; 40-8 beam; 10-4½ draft; 2 Comp. engs. 860 I.H.P.; 2 Scotch boilers; 10′ dia. 13′ long.

No name, hull 1399, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD., BALTIMORE DRY DOCKS WORKS

Baltimore, Md.

Hull 6132, dredge hull, Ellicott Machine Corp., 160 feet long; 40 feet wide; keel Oct. 17/25; launched Dec. 23/25; **delivered Dec. 30/25.**

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT

Wilmington, Del.

Port Houston, hull 3500, fireboat for the City of Houston, Texas; 117-6 LBP; 27 beam; 8-6 loaded draft; twin screw; diesel-electric drive; 14 mi speed; two 500 HP Winton 4-cycle diesel engs: Westinghouse generators; keel Oct. 5/25; launch Feb. 15/26 est.

Philadelphia, hull 3501, ferryboat, for Philadelphia & Reading R.R.Co.; 198 L.B.P.; 35 beam; 10 draft; comp. engs. 1100 I.H.P.; 2 Scotch boilers, 11x21 ft.; keel Dec. 2/25.

Cape May, hull 3502, sister to above; keel Dec. 15/25.

Mantua, hull 3503, dredge hull for U.S. Engineers, Wilmington, Del.; 86′ L.B.P.; 24′ beam; 7′ depth.

No name, hull 3504, passenger and auto ferryboat for Fisher's Island Navigation Co.; 150′ L.B.P.; 40′ beam; 15′ 6″ depth; Scotch boilers; single screw; 800 H.P.

CHARLESTON DRY DOCK & MACHINERY COMPANY

Charleston, S. C.

Purchasing Agent: Charles R. Valk.

Daytona Beach No. 1, freighter for Daytona Beach, Fla.; 22 beam, 4 draft; 8 knots, 60 I.H.P. Fairbanks-Morse diesel engs.

Daytona Beach No. 2, sister to above.

Two lighters for Daytona Beach, Fla.

Selma, snagboat for U.S. Army Engineers, Montgomery, Ala; deliver Feb./26 est.

Hydraulic dredge for Sanford & Brooks.

No name; hull 11, diesel double-ended drive ferryboat for Cooper River Ferry Commission, Charleston, S.C.; 120 L.B.P.; 35 beam; 6′ 6″ draft, 8 knots speed; 360 I.H.P. diesel engs.; keel Jan. 20/26 est.

CONSOLIDATED SHIPBUILDING CORPORATION

Morris Heights, N. Y.

Hull 2780, steel cruiser, W. O. Briggs; 118x21; 2 180-HP Winton diesel engs.

Hull 2796, cruiser for C. W. Sellick, 50 ft long; Liberty engs.

Hull 2797, cruiser for R. F. Hoyt, 81 ft long; 2 Wright & Typhone engs, 500 HP each.

Hull 2798, cruiser for H. C. Stutz, 65 ft long; 2 180-HP Speedways.

Hull 2799, cruiser for Elliott & Co., 44 ft long; 180-HP Speedway.

Hull No. 2800, cruiser for J. S. Caldwell, 68 ft long; 2 150-HP Speedways.

Hull 2801, cruiser for L. P. Fisher, 70 ft long; 2 300-HP Speedways.

Hull 2803, cruiser for G. M. Brown, 92 ft long; 2 300-HP Speedways.

Hull 2807, steel cruiser for Carl Fisher, 150 ft long.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO.

Philadelphia, Pa.

Purchasing Agent: Ed. C. Geehr.

Malolo, hull 509, express psgr and frt liner, Matson Navigation Co.; 582 LOA; 577 length at water line; 83 ft beam; depth molded to C deck 54 ft; displacement 22,050 tons; 8250 DWT; speed 22 knots regular, 23 knots maximum; 25,000 shaft horsepower; Cramp-Parsons turbines; oil burning B&W water-tube boilers; keel May4/25.

No name, hull 518, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55-6 beam; 29-6 molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears, six single-ended Scotch boilers; keel Feb. 10/26, est.

Hulls 519-523 inc., 5 steel dump scows for American Dredging Co.; 550 cu. yds. capacity; 112 length, molded; 34 beam; 12 depth molded; keels Dec. 7, 8, 23/25.

No name, hull 524, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55′6″ beam; 29′6″ molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears; 6 single-ended Scotch boilers.

DEFOE BOAT & MOTOR WORKS

Bay City, Mich.

Purchasing Agent: G. O. Williams.

Hull No. 85, steel vessel U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 210 DWT; 300 IHP, diesel engs.; keel April/25; launch Apr. 11/26 est.; deliver Apr. 15/26 est.

Hull No. 86, sister to above; keel Apr10/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 87, sister to above; keel Apr18/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hul No. 88, sister to above; keel May5/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 89, sister to above; keel June15/25; launch April 11/26, est; deliver Apr. 15/26, est.

Hull 90, steel patrol boat for U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 12 mi speed; 210 DWT; 300 IHP diesel engs; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 91; sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 92, sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Sylvia, hull 93, steel yacht, Logan G. Thomson; 133 LBP; 21-6 beam; 7-6 loaded draft; 14 mi speed; 600 IHP twin Bessmer diesel engs.; keel Nov. 15/25; launch May 1/26 est.; deliver May 15/26 est.

No name, hull 94, wooden yacht for Geo. M. Kelley, Detroit; 55 LB.P.; 13 beam; 3-9 draft; 13 mi. speed; 13 D.W.T.; 140 I.H.P. gas engs.; keel Jan. 1/26; launch May 1/26, est.; deliver May 15/26, est.

Lassie, hull 95, wooden yacht for T. B. Van Dorn, Cleveland, same as above; keel Jan. 1/26; launch May 1/26, est.; deliver May 15/26, est.

No name, hull 96, wooden yacht for Hacker & Ferman, Detroit; same as above; keel Jan. 1/26; launch May 1/26, est; deliver May 15/26, est.

No name, hull 111, wood yacht, for I. M. Kirlin of Detroit; 55 L.B.P.; 13 beam; 3′ 9″ draft; 13 mi. speed; 13 D.W.T.; 140 H.P. gas engs.; keel Jan. 15/26 est.; launch May 1/26 est.; deliver June 1/26 est.

No name, hull 112, wood yacht for Alex McLeod of Detroit, same as above; keel Jan. 15/26 est.; launch May 1/26 est.; deliver June 15/26 est.

No name, hull 118, wood yacht for John J. Barlum of Detroit; 65 LBP; 12′ 6″ beam; 3′ 6″ draft; 28 mi. speed; 15 D.W.T.; 600 H.P. gas engs.; **keel Jan. 18/26.**

No name, hull 119, wooden yacht for Contgomery Whaling, Detroit; 44′ L.B.P.; 10′6″ beam; 2′11″ loaded draft; 22 mi. speed; 10 DWT.; 200 H.P. gas engs.; **keel Feb. 1/26;** launch May 1/26 est.; delivery June 1/26 est.

DRAVO CONTRACTING COMPANY

Pittsburgh, Pa.

Hulls 450-452 inc., 3 steel fuel barges for U. S. Engineers, St. Louis, Mo., 152 x34x6; 300 gro tons each.

Wakerobin, hull 453, lighthouse tender for Bureau of Lighthouses, 153-6 long, 43 beam; 6-6 depth; 900 gro. tons.

Hull 454, 1 sand digger for Keystone Sand & Supply Co., Pittsburgh, 153-6x43x6-6; 900 gro. tons.

Hulls 455-456, 2 steel oil barges, 90x23-6x9; for Atlantic Gulf & Refining Co.; 177 gro. tons ea.

Hulls 457 and 458, 2 sand and gravel barges for Missouri Portland Cement Co.; 130x30x7-6; 280 gro. tons each.

Hulls 459-464 inc.; 6 steel barges for stock; 100x26x6-6; 135 gro. tons ea.

Hulls 465-476 inc., 12 steel barges for stock; 100x26x6′6″; 135 gro. tons ea.

Hulls 477-486 inc., 10 steel barges for Equitable Towing & Trans. Co.; 140x26x9 ft.; 230 gro. tons ea.

Hulls 487-492 inc., 6 steel barges for stock; 130x 30x7′ 6″; 830 gro. tons ea.

Hulls 493-502 inc., 10 steel barges for stock; 230 x45x11 ft.; 650. gro tons ea.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent: R. S. Page.

Steel Chemist, hull 83, freighter, U. S. Steel Corp.; 250 LBP; 42 ft 9 in beam; 20 loaded draft; 2100 DWT; Worthington engs. 950 SHP; keel Sept. 15/25.

Steel Electrician, hull 84, diesel-electric freighter, U. S. Steel Corp.; 250 LBP; 42-9 beam; 20 loaded draft; 2100 DWT; 750 BHP Nelseco engs; keel Sept. 24/25.

Willets Point, hull 85, seagoing, diesel-electric hopper dredge for U. S. Army Engineers; 193 ft LBP; 41 beam; 19 ft 6 in depth molded; two Winton diesel engines; keel Dec. 16/25.

No name, hull 86, tanker for Gulf Refining Co.; 525′ L.B.P.; 74′ beam; 28′ loaded draft; 11 knots speed; 17,400 D.W.T.; 4500 I.H.P. diesel engs.

Hull 87, lighter for Wm. Spencer & Son; 104′ 6″ long; 32′ beam; 10′ depth; 300 D.W.T.

Hull 88, lighter, sister to above.

GREAT LAKES ENGINEERING WORKS

River Rouge, Mich.

Purchasing Agent: Chas. Short.

Halcyon, hull 252, automobile and passenger ferry for Walkerville & Detroit Ferry Co., 128 L. B. P.; 45 beam; 12 loaded draft; 12 mi. speed; 900 I.H.P. F. & A. comp. engs.; 2 Scotch boilers 11 ft. 6in.; keel Dec. 12/25; **launched Dec. 12/25; delivered Jan. 30/26.**

Hull 253, dump scow for Great Lakes Dredge & Dock Co., Chicago; 1500 cu. yds. capacity; keel Feb. 20/26 est.; launch Apr. 10/26 est.; deliver June 1/26 est.

HOWARD SHIPYARDS & DOCK COMPANY

Jeffersonville, Ind.

Purchasing Agent: Jas. E. Howard, President.

Gouverneur, hull 1583, diesel-electric towboat for U.S. Engineers, St. Louis, 100 LBP; 23 beam; 4 draft; 2 150-H.P. diesel engs; keel Nov. 1/25.

Louisiana, hull 1586, steam ferry, catamaran type, for Baton Rouge Trans. Co.; 150 LBP; 50 deck beam, 18 hull beam; 5 loaded draft; high pressure steam engs.; 500 I.H.P.; 2 firetube boilers 44″ x22′; keel Feb. 15/26 est.

No name, hull 1587, maneuver hull for Vicksburgh Engineers; 60x26x6ft.; keel Mar. 1/26 est.

No name, hull 1588, concrete mixer hull for Vicksburg Engineers; 128x42x7 ft.; keel Feb. 20/26 est.

No name, hull 1589, diesel ferry for Tri-State Ferry Co., Cairo, Ill.; 100x30x5 ft.; 200 I.H.P. diesel engs.; keel Mar. 15/26 est.

No name, hull 1590, diesel-electric side-wheel excursion boat for stock; 250x40x7 ft.; 15 mi. speed; 2400 HP diesel engs.

No name, hull 1591, steam ferryboat for Vicksburg & Delta Ferry Co., Vicksburg, Miss.; 140′ L.B.P.; 32′ beam; 6′ deep; 3′ loaded draft; 10 mi. speed; abt. 250 D.W.T.; straight high pr. engs, 12′ x6′;2 fire tube boilers, 44″x22′; keel Apr. 1/26 est.

No name, hull 1592, steam towboat for Barrett Line, Cincinnati; 125′ L.B.P.; 40′ beam; 6′ deep; 4′ loaded draft; comp. engs. 18″x32″x6′; 4 Scotch boilers, 44″x22′; keel Apr. 15/26 est.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wis.

Purchasing Agent: H. Meyer.

No name, hull 222, double-end car ferry, Wabash Railroad; 370 L. O. A.; 65 beam, 21 ft 6 in depth; two screws at each end; 4 comp. engs. of 1000 HP each; 6 Scotch marine boilers; keel Nov. 30/25; deliver spring 1926, est.

MARIETTA MANUFACTURING CO.

Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Hulls 145-150, inc., six barges for Indiana-Belfont Transportation Co.; 150 long; 36 beam; 10 draft; keels Aug. 15/25; 4 delivered.

Belfont, hull 151, diesel stern-wheel, for Indiana-Belfont Transportation Co.; 100 long, 24 beam; 4-4 draft; 360 HP Fairbanks-Morse diesel engs.; keel Oct. 25/25; deliver Mar. 1/26 est.

MIDLAND BARGE COMPANY

Midland, Pa.

Purchasing Agent: H. S. Neal.

Contract 1045, dredge for Alleghany River Sand Co., Pittsburgh.

Contract 1047, hopper float, E. T. Slider, New Albany, Ind.

Contract 1048, 3 hopper barges for Crusible Fuel Co.

Contract 1050, 6 hopper barges for Alleghany River Sand Corp.

Contract 1051, 2 steel wharf boats with steel cabins for Baton Rouge Trans. Co.; 110′x30′x6′.

Contract 1052, 12 steel deck flat scows, 75′x25′ x5′ 6″; for Sate of New York, dept. of public works, Bureau of Canals.

MIDLAND SHIPBUILDING COMPANY, LTD.

Midland, Ontario

Purchasing Agent: R. S. McLaughlin.

Glenmohr, hull 16, single deck freighter for Great Lakes Transportation Co., Ltd., Midland, Ontario; 633 L. O. A.; 70 beam; 29 depth; 11 knots speed; 18 ft. loaded draft; 15,000 D.W.T.; TE engs. 3000 HP; keel Nov. 18/25; launch July 14/26, est.

NASHVILLE BRIDGE COMPANY

Nashville, Tenn.

Purchasing Agent: Leo E. Wege.

Nashville B., hull 92, diesel towboat, builders' account; 110 LBP; 28 beam; 5 loaded draft 400 IHP diesel engs.; keel May 1/25; launched Oct. 27/25.

Burnett, hull 94; diesel-electric towboat, U. S. Engineers; 70 LBP; 17 beam; 4 draft; 150 HP TE engs.; keel Oct. 10/25; launch Feb. 25/26, est.

Gillett, hull 95, same as above; keel Oct. 15/25; launch March /26, est.

Kings Landing, hull 98, towboat, twin screw; 75 LBP; 19 beam; 4½ loaded draft; 240 BHP diesel engs.; keel Oct. 10/25; **launched Jan. 14/26.**

Hull 102, deck barge, 100x24x5; **delivered Jan. 30/26.**

Hull 103, deck barge, 142x32x9; keel Jan. 15/26, est; launch and deliver March 1/26, est.

Hull 104, dredge hull, 75x24x5 ft.; keel Feb. 15/26, est.; deliver Mar. 1/26, est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas: Plummer, 233 Broadway New York City.

Mohawk, hull 287, combination steamer, Clyde S. S. Co., 387 ft 6 in LBP; 54 ft beam; 31 ft 6 in draft; 14½ loaded speed; 2600 DWT; Newport News-Curtis turbines, 4200 SHP; 4 Scotch boilers; keel Apr. 1/25; launched Oct. 21/25; **delivered Feb. 1/26.**

Chatham, hull 288, combination passenger and freight steamer, Merchants & Miners Transportion Co., Baltimore, Md.; 350 length; 52 beam; 36 depth; 13½ mi speed; TE eng; 4 Scotch oil-fired boilers; keel July 30/25; **launched Feb. 3/26.** Deliver May 1/26, est.

Dorchester, hull 289, sister to above; keel Sept 10/25; launch Mar. 26, est.

Fairfax, hull 290, sister to above; keel Nov. 12/25.

Hull 292, diesel-electric 20-in pipe line suction dredge, U. S. Engineers, Philadelphia; 230 ft long; 40 ft beam; 14 ft depth; McIntosh & Seymour diesel engs.; keel Nov. 19/25; launch Mar/26, est.

Pawnee, hull 293, yacht for Hany Payne Bingham; diesel eng.; keel Sept. 21/25, launched Nov. 12/25; **delivered Jan. 12/26.**

Savarona, hull 303, diesel yacht, 2 screws for R. M. Cadwalader; 174 L.O.A.; 27 beam; 15 ft. 8 in. depth; Winton engs.; **keel Jan. 16/26.**

Arcadia, hull 304, diesel yacht, 2 screw, for Galen L. Stone; 177 L.O.A.; 27 ft 6 in beam; 15 ft 8 in depth; Winton engs.; keel Mar/26, est.

Josephine, hull 305, diesel yacht, 2 screw, for E. S. Burke, Jr., 132 L.O.A.; 24 beam; 13 ft 1 in. depth; Winton engs.; keel May/26,est.

No name, hull 306, passenger and freight steamship for Clyde Steamship Company, New York, 407′-3″ overall, 62′-0″ beam, 30′-6″ depth, Newport News turbines and gear; 8500 I.H.P.; Scocth boilers; oil burning; keel March/26, est.

No name, hull 307, sister to above; keel Apr./26, est.

Aras, hull 308, diesel engine yacht, for Hugh J. Chisholm; 162′-0″ long, 26′-0″ beam, 14′-6″ depth; Winton diesel engs.; **keel Feb. 1/26.**

Hulls 309-311, inc., three house barges, for Chesapeake & Ohio Railway; 100′-0″ long, 30′-0″ beam, beam, 8′-6″ depth; **keels Jan. 16/26.**

Hull 312, one carfloat, for Chesapeake & Ohio Railway, 256-0″ long, 36′-0″ beam, 10′-0″ depth; **keels Jan. 30/26.**

No name, hull 313, tugboat hull, for the Pennsylvania Railroad, 80′-0″ long, 19′-0″ beam, 12′-6″ depth; **keel Feb. 26 est.**

No name, hull 314 sister to above; **keel Feb./26,** est.

No name, hull 315, 18-knot, passenger liner for Panama Pacific Line, New York; 600 ft. long, 80 ft. beam, 52 ft. depth; watertube boilers for oil 22,000 gross tons; 17,000 I.H.P.; keel May/26, est.

Robador, hull 316, diesel engine yacht, for Robert Law, Jr., 160′-6″ long, 26′-0″ beam, 14′-9″ depth.

No name, hull 317, passenger and freight steamship for Clyde Steamship Co., New York, 402′-0″ overall, 55″-0″ beam, 31′-6″ depth; Newport News turbines and gears; Scotch boilers for oil burning.

THE PUSEY & JONES CO.

Wilmington, Del.

Purchasing Agent: James Bradford.

No name, hull 1030, single screw passenger and freight steamer for Baltimore & Philadelphia Steamboat Co., Philadelphia; 219 L.B.P.; 45 beam; 11 loaded draft; 14½ mi speed; 4 crank, TE engs. 21-32-35-35 by 24″; two B. & W. water-tube boilers, 3046 sq. ft. heating surface each; keel Nov. 11/25; launch Mar. 10/26, est, deliver July 1/26, est.

No name, hull 1031, sister to above.

Siele, hull 1032, twin screw diesel yacht for John H. French, Detroit; 124 L.O.A.; 20-6 beam; 6-10 draft; 2 300 HP Winton diesel engs.; keel Dec. 1/25; launch Apr. 1/26, est.; deliver June 1/26, est.

STATEN ISLAND SHIPBUILDING COMPANY

Staten Island, N. Y.

Purchasing agent: R. C. Miller.

American Legion, hull 764, ferryboat for City of New York, 264 L.O.A.; 66 beam over-all, 47 beam mld.; 14 loaded draft; 15 mi. speed; abt. 2600 gro. tons; 2 comp. engines, 3500 I.H.P.; 4 W. T. boilers; **keel Feb. 8/26.**

No. 33, hull 765 tugboat hull for New York Cenral R.R.; 96′x26′x10′-3″; 12 knots speed; 200 gr. tons; 650 I.H.P. diesel-electric prop. unit; deliver July/26, est.

No. 34, hull 766, tugboat, sister to above.

Hull 767, barge for National Lead Co.

SUN SHIPBUILDING COMPANY

Chester, Penn.

Purchasing Agent: H. W. Scott.

Hull 85, carfloat. Pennsylvania Railroad; 358 LBP; 47 ft 4 in beam; 12 ft 6 in depth; keel July 29/25; launch Dec. 24/25, est.

Hull 86, sister to above; keel Aug1/25; launch Dec16/25, est; deliver Jan9/26, est.

Hull 88, sister to above, keel Aug. 3/25; launched Nov. 27/25; **delivered Dec. 7/25.**

Hull 91, carfloat, Pennsylvania R. R.; 230 LBP; 38 beam; 10 ft. 6in in depth; keel Aug 31/25; **delivered Feb. 2/26.**

Hull 92, carfloat, sister to above; keel Sept7/25; **delivered Feb. 2/26.**

Wicomico, Hull No. 93, tug, for Pennsylvania R. R.; 116x24x13-8; keel Sept. 14/25.

Hull 95, barge for Sun Oil Co., 100x19x9, 50,000 gals. cap.; 100 B.H.P. engs.

Hull 96, barge for Sun Oil Co. 158-x24-4-x11-3, 150,000 gals. cap; 150 B.H.P.

Hull 97, barge for Sun Oil Co., 260x40x15; 750 BHP. engs.

TODD ENGINEERING, DRYDOCK & REPAIR CORP.

Brooklyn, N. Y.

Sumar, hull 37, steel twin-screw diesel motor yacht for David C. Whitney; 151′ LBP; 26′ beam; 12′ loaded draft; 2 Bessemer diesel engs. 420 S.H.P. each.

Hull 38, steel scow for J. G. White Eng. Corp.; 40′ L.P.B.; 17′ beam; 5′ 6″ draft; **delivered Jan./26.**

No name, hull 39, steel twin-screw diesel motor yacht for S. P. Davis; 162′ 10″ L.B.P.; 27′ 4″ beam, 13′ loaded draft; 14 mi. speed; 2 Bessemer diesel engs.; 800 S.H.P. ea.

THE CHARLES WARD ENGINEERING WORKS

Charleston, W. Va.

Purchasing Agent: E. T. Jones.

No name, hull 38, sternwheel towboat, The Ohio River Co.; 145 LBP; 32 beam; 5 draft; recip 700 IHP engs.; return tubular boilers, 42 in. x 26 ft.; **keel Jan. 15/26.**

No name, hull 39; steel barge, Kelly Axe & Tool Co.; 150 long, 26 beam; 8 deep; keel Oct. 13/25; launched Dec. 21/25; **delivered Jan. 13/26.**

No name, hull, 40, sister to above; keel Oct. 26/25; **delivered Jan. 13/26.**

No name, hull 41, sister to above; keel Nov. 24/25; **delivered Jan. 13/26.**

No name, hull 42, sister to above; **keel Jan. 11/26**

No name, hull 43, sister to above; **keel Jan. 15/26**

No name, hull 44, sister to above.

No name, hull 45, sister to above.

No name, hull 46, sister to above.

No name, hull 47, sister to above.

Repairs

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Union Plant, San Francisco.

Drydock, paint, misc. repairs: W. S. Miller, Arizonan, Mongolia, West Hixton, Sierra, Hellenic, Colorado, Minnesotan, Angel Island. Dock and misc. repairs; West Nilus, Richmond, Arizonan, Lio (tail shaft). Drydock, paint, engine, boiler, hull repairs: Wm. F. Herrin, Alvarado, Solano, Diana Dollar, Wm. F. Herrin, Maunawili, McKittrick, Waitemata, Shell Co. Barge No. 1. Boiler repairs: Wm. A. McKenny, Waiotapu (also engine). Engine, boiler, hull repairs: Chiapas, Loch Katrine, City of Naples, Tahiti, Esther Johnson, Corvus, Chihuahua. Tailshaft: F. A. Warner, Yankee Arrow, Tulsagas, Makena. Misc.: Agwisea, Sinaloa, San Gaspar, Solano, Claremont, Aurora, J. B. Stetson, Doris Crane, Point Arena, General, Kansan, Sudnuffco, Betterton, Lebec, K. I. Luckenbach, D. G. Scofield, Hegira, Robin Goodfellow, Oregonian, President Grant, Pacific, Hawaiian, Ohioan, New Mexico, Robert Johnson, Lena Luckenbach, Yankee Arrow, Oklahoma, Rose City, Finland, Capt. A. F. Lucas, Robert Luckenbach, California, President Wilson, Hanley, Sucarseco, Guerrero, Henry S. Grove, K. R. Kingsbury, Pennsylvanian, Eureka.

San Pedro Works

Drydocked and repairs: Strs. San Patricio, Chuky, yachts Invader. Misc. Repairs: Stmrs. Halco, San Gaspar, Argyle, Derby Line, Veranger, Geo. W. Barnes, Rose City, Deroche, Newport, Suboatco, Emedio, Byron D. Benson, San Dustano, San Florentino, Utacarbon, San Gregorio, H. C. Folger, Richfield, Commercial Pathfinder, Coalinga, Hardanger, barge Ricco I., m.s. Los Alamos, schr. Tamalpais. Glenross. Bottom damage repairs: stmr. Belvoir.

HANLON DRY DOCK & SHIPBUILDING CO.,

Oakland, Calif.

Purchasing agent: Ralph Barker.

General overhauling: stmrs. Costa Rico, West Mahwah (also drydocked), Olympic (also new propeller hub and new tail shaft), Idaho (also new mast, drydocked), West Cahokia (also new stern

LOS ANGELES SHIPBUILDING AND DRYDOCK CORPORATION,

San Pedro, Calif.

Cleaned, painted: Salvage tug Peacock (new rudder post section), barge Jack Kane (general repairs), fishing tender Curtiscar, stmr. Calawaii (overhaul of shafts, propeller, new starboard shaft), Tecumseh, Union Oil barge 1923 (fitted for sea tow). Dock, clean, paint, annual general overhaul of engines and boilers, interiors redecorated: Yale, Harvard.

LIFE SAVERS

WISE CRACKERS

Familiarity breeds consent.

A case on land is worth two at sea.

Pretty soon the millionaires will adopt a "caste" system—the aristocracy, the "note shavers"; the bourgoise "bootleggers."

A stitch in time "So's your old man."

A word to the wise is unnecessary.

Why do you always send the doctor's wife apples?

An apple a day will keep the doctor away.

Have you ever been to Honolulu?
Yes.
How did you go?
By rail.
Oh!

What we want to know is, if this new-fangled rotor ship becomes universal, what's going to become of the old-fashioned stoker? Will he be called a rotator, or a rotarian, or what?

Do right at any cost and people will say you are square if you are a crank.

Full Bunkers.

They were getting ready to bury Murphy, who had died at sea. It was discovered that there were no irons to sink the body, so the chief engineer gave orders to the black gang to get some chunks of coal to lash to the body, which was done.

As the captain was reading the burial service Sullivan, the fireman, roared laughing.

The captain looked sternly at the offender and said:

"Now, Sullivan, have you no respect for the word of God or for the dead?"

"Sure, Captain," returned Sullivan. "I have. I've seen many a fireman die and go to hell, but Murphy is the first one I ever saw who had to take his own coal wid him!"—Standard Oil Ship's Bulletin.

A Double-Barreled Business

A man got stalled with his automobile in a mudhole near Bass Lake last week. While making a vain attempt to get out a small boy appeared with a team of horses.

"Want me to haul you out, Mister?"

"How much do you want?"

"Three dollars."

After the work had been done and the money paid the tourist asked:

"Do you pull out many cars here?"

"About twelve a day on the average," replied the boy.

"Do you work nights, too?" inquired the tourist.

"Yes, I haul water for the mudhole."—North Judson (Ind.) News.

The Retort Courteous.

A spinster living in a London suburb was shocked at the language used by workmen repairing telegraph wires close to her house. She wrote to the company, and the foreman was asked to report. This he did in the following way:

"Me and Bill Fairweather were on this job. I was up the telegraph pole, and accidentally let the hot lead fall upon Bill. It went down his neck. Then he said: "You really must be more careful, Harry."
—London Daily Express.

The Inevitable Seven

Sir Bertram Hayes, the valiant skipper of the Majestic, has retired from sea life after 44 years of service. He said to a reporter on his last visit to New York:

"There are seven questions that are put to every sea captain on every sea voyage he makes. I never crossed the herring pond without being asked these questions at least a hundred times:

" 'Say, cap, how deep is the ocean here?'

" 'What time do we arrive?'

" 'Are you paid by the week or piece work?'

" 'Look here, captain, to decide a bet—what kind of oil do you pour on the waves to smooth them down, olive, coal, or cotton seed?'

" 'Can this ship go any faster than she does?'

" 'What makes the water so green, captain?'

" 'Do you remember my aunt, Mrs. Mary K. Johnson, who crossed with you in the spring of 1914?' "

Noblesse Oblige.

An Irish fireman, rescuing a woman at a blaze, lost his hold near the bottom of the ladder and landed heavily with the woman on top of him. A doctor hastily summoned pronounced Pat sound, though badly bruised.

"You are a brave gentleman," said the doctor.

"Brave, maybe, but no gentleman," returned Pat, rubbing his injuries, "or I'd a-let the lady go first."
—Boston Transcript.

Drawn by Leo Cheney

VOICE FROM THE GROUND: Can you manage to 'ang on a bit longer, Albert? We're gettin' a rope."

ALBERT (a conscientious union man): "Well, for goodness sake, man, 'urry up. I'm due to knock off in abaht ten minutes." —*The Passing Show* (London.)

Why Argue?

Prof.: Can you prove that the square of the hypothenuse is equal to the sum of the squares of the two sides of this triangle?"

Stude: I don't have to prove it. I admit it."—Denver Parrakeet.

Salute the Skipper.

Newlywed (after the ceremony): Dearest, do you really think that I'll prove a satisfactory mate? "

Mrs. Newlywed: Oh, you'll do for a mate, all right. Now look me over and tell me what you think of your captain."—The Continent (Chicago).

Point of View.

"Only those who have been aroused from sleep on board ship by the terrible cry, 'Man overboard!' " said the lecturer, "can realize its terrible meaning."

"That's not right," interjected a little man in the audience. "I heard it once when I was not aboard ship and I realized it more than anybody."

"You couldn't," objected the lecturer.

"Oh, yes I could," persisted the little man. "I was the man who was overboard."
—Lake Carriers' Bulletin.

Go Way!

Teacher: Who can give me a sentence using the word "Avaunt"?

Little Abie: Avaunt what avaunt when avaunt it.

The Inevitable.

"Sir, your daughter has promised to become my wife."

"Well, don't come near me for sympathy. I knew something like that would happen to you, hanging around the house five nights a week."

No Vegetarian.

A negro employed at one of the movie studios in Los Angeles was drafted by a director to do a novel comedy scene with a lion.

"You get into this bed," orderd the director, "and we'll bring the lion in and put him in bed with you. It will be a scream."

"Put a lion in bed with me!" yelled the negro. "No sah: Not a'tall! I quits right here and now."

"But," protested the director, "this lion was brought up on milk."

"So was I brung up on milk," wailed the negro, "but I eats meat now."—Kablegram.

Divine Photography.

Little Sam was sitting on the stairs watching a violent thunderstorm with evident delight.

"What yo' all doin' out in the rain?" called his mother.

"Oh, mammy," he cried, "I was sitting heah and the Lord done took a flashlight of me!"
—Sunday Companion.

Henry's Alibi.

Teacher (to boy sitting idly in school during writing time):

"Henry, why are you not writing?"

Henry—"I ain't got no pen."

Teacher—"Where's your grammar?"

Henry: "She's dead."—Dry Goods Economist.

Breaking the News.

Mrs. Silvertown: Ethel, has anyone ever told you that your chin was ugly?

Mrs. Vandergilt: No, dear, why?

Mrs. Silvertown: I see you are trying to grow another one.

Evolution.

He: "Dearest, our engagement is off. A fortune teller just told me that I was to marry a blonde in a month."

She: "Oh, that's all right; I can be a blonde in a month."

Clerk (driven to desperation by bargain hunting boy): "Listen, young man, why don't you take that top? Do you want to get the world with a fence around it for a nickel?"

Boy: "I dunno! Let's see it."
—Iowa Independent Topics.

There's a Reason.

A colored agent was summoned before the Insurance Commissioner.

"Don't you know," said the Commissioner, "that you can't sell life insurance without a State License? "

"Boss," said the darkey, "yo' said a moufful. Ah knowed ah couldn't sell it, but ah didn't know de reason."

Entomological Mathematics.

Captain: "What are you scratching your head for, Rufus?"

Colored Private: "Aw, sah, I done got arifmetic bugs in mah hair, sah."

Captain: "What are arithmetic bugs?"

Colored Private: "Dat's cooties."

Captain: "Why do you call them arithmetic bugs?"

Colored Private: "'Cause dey add to mah misery, dey subtract from mah pleasure, dey divide mah attention, and dey multiply like de dickens!"—Nebraska Awgwan.

Witless Art vs. Artless Wit.

Last summer in central Illinois an Irishman was helping to build a new concrete road. He hung his coat on a fence post. Some of the rest of the gang painted the head of a mule on it. When it came time to quit, the Irishman looked at the coat a minute and said:

"Which one of you guys wiped your face on me coat?"—S.O. Ship's Bulletin.

A Dippy One From Florida.

The Florida beach and the blue sea looked inviting to Bill Blank when he was idling 'neath sunny Southern skies about a month ago. Before venturing out to swim, Bill thought to make sure and asked the guide if there were any alligators in the vicinity.

"No, sir," the guide told him, emphatically shaking his head from east to west, "there ain't no 'gators here."

Reassured, Bill started out, and as the water lapped about his chest, called back: "What makes you so sure there aren't any alligators?"

"They's got too much sense," bellowed the guide. "The sharks skeered them all away."—Neptune Log.

Good Roads Gospel.

A minister, while passing a group of convicts at work on the country roads, became very much depressed at the wickedness of the world.

"My good men," he exhorted, "we should strive to mend our ways."

"Well, wotinell d'ye think we're doing, asked No. 2389, "diggin' fish-worms? " — Carolina Buccaneer.

GUARANTEE

Each and every Life Saver on this page is guaranteed by the Pacific Marine Review to have passed inspection by our Bumboat Inspection Service and to be stuffed with first-class California tule impregnated with nitrous oxide and well soaked in sea water.

Personal Paragraphs and Items of Interest

Wm. J. Brady Home After Tour

WILLIAM J. BRADY, marine superintendent of the Dollar Steamship Lines, headquarters, San Francisco, is home after an extended inspection of the company's terminal's, steamers, and property on the Atlantic Coast. It is authoritively confirmed that in Kansas it gets so dry they have to "hoop the hogs" so they'll hold feed; sort of a similar problem has William J. Brady —if the freight securing ability of Andy Moran and staff increases much more Mr. Brady is gonna hoop the Dollar liners so they won't bust open.

Prescott Dock Tractors

Sumner K. Prescott, president of the Prescott Iron Works, Seattle, announces the sale of seven Prescott dock tractors to the Seaboard Stevedoring Company at San Francisco, this organization handling the freight of Norton, Lilly & Company. Three more Prescott dock tractors have been added to the fleet of the San Francisco Stevedoring Company.

De Laval Pacific

George C. Stoddard is now at the San Francisco headquarters of the De Laval Pacific Company, as manager of the industrial centrifugal department. For five years Mr. Stoddard was sales engineer of the firm in the Southern California and Arizona territory.

J. V. Shepard, formerly manager of the industrial centrifuge department, has been transferred to special service work in the field pertaining to power-driven De Laval centrifugals for all purposes. This important phase of De Laval service is rapidly increasing on account of growing popularity of De Laval machines. Mr. Shepard, through his widespread and thorough experience with power-driven centrifugals, is especially qualified for the work of augmenting the field service already extended by the De Laval organization.

W. R. Grace & Co. Increases Fleet

The purchase from the Shipping Board of the freighters West Kasson and West Inskip by W. R. Grace & Co. gives this company a fleet of six vessels operating between Pacific Coast Ports of North America and the West Coast of South America.

Daly Joins R. W. Giddings Staff

Widespread friends of T. O. Daly of San Francisco will be interested in the announcement of his association with the R. W. Giddings Supply Company, one of the fastest growing marine supply firms on the Pacific Coast. Mr. Daly is well known as a member of the United States Steamboat Inspection Service at San Francisco, his work in that department covering a number of years.

Plibrico Treasurer Inspects Coast

Albert Goetz, treasurer of the Plibrico Jointless Firebrick Company, Chicago, recently visited the Pacific Coast and Hawaiian Islands, accompanied by Mrs. Goetz. While in San Francisco the visitors were entertained by W. G. McGee, president of the McGee Sales Agency, representatives of Plibrico affairs in central and northern California. Mr. McGee attended the Power Show at Chicago and accompanied Mr. and Mrs. Goetz on their westward journey.

New Marine Organization

The Puget Sound Shipowners' Association was formed at Seattle in January, and comprises Puget Sound freight and passenger operators. The purpose of the association is a uniform tariff for the Puget Sound freight routes. Philip D. MacBride, Seattle attorney and one of the owners of the Kitsap County Transportation Company, was elected president; Captain F. E. Lovejoy of the Puget Sound Freight Lines, secretary; and Mrs. Anna Graham Grimison of the Skagit River Navigation & Trading Company was elected treasures. Committees were appointed to cover the interests of ferries, freight and passenger vessels, and freight operators.

New Offices Griscom-Russell

General offices of the Griscom-Russell Company are now located in the new Murray Hill building, 285 Madison avenue, New York City.

Seattle Exchange

Five trustees were elected for two-year terms recently by the Merchants Exchange of the Seattle Chamber of Commerce. They are: Shipping, Otto H. Eisenbeis, district manager of the McCormick Steamship Company; grain, A. A. Ryer, president, Ryer Grain Company; Lumber, L. R. Gaynor, Jr., vice-president of the Nettleton Lumber Company; Fisheries, Victor H. Elfendahl, president, Sunny Point Packing Company; Railroads, W. E. Coman, western traffic manager, Northern Pacific Railway Company.

Matson Using 47 Elwell-Parkers

Ira G. Perin, distributor for Elwell-Parker electric industrial trucks at San Francisco, reports the sale of five 2½-ton electric trucks of a new type to the Matson Navigation Company. This makes a total of 47 electric industrial trucks, mostly of self-loading or elevating type, in the Matson fleet. This fleet has been growing in number for over eight years which would indicate that electric trucks meet their requirements in expediting the movement of freight and in turn speeding up the movement of ships for this progressive steamship company.

New Foreign Agencies

With the return of Harry S. Scott, president of the General Steamship Corporation, to San Francisco, announcement was made of arrangements with Westfal-Larson & Company of Bergen, Norway, by which a fleet of five motorships will be operated by the General Steamship Corporation between Pacific Coast ports of the United States and Canada and the East Coast of South America.

Another agency arranged by Mr. Scott was that of Winge & Co. of Oslo, whereby the vessels operated by the General Steamship Corporation will be increased from five to eight. These vessels are operated between North Pacific Coast ports and Mexico, Central America, and the West Coast of South America.

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Coastwise
Fleet

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Motorship "Texaco 146." Length, 156 ft. Beam, 24 ft. Full-load draft, 11 ft. 4 in. Deadweight capacity, 1000 tons. Propelling power, single screw driven by 390 i. hp. McIntosh & Seymour Diesel Engine. A sister ship, "Texaco 147" is similarly equipped. Fuel consumption about 12 bbl. per day at average speed of about 8 knots.

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THE "Texaco 146" and "Texaco 147," operated by the Texas Steamship Co. between refineries and sea and river ports, afford a good example of what Diesel power will do in adapting vessels of moderate capacity and draft to both inland and sea service.

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Notwithstanding that these are single-screw ships, giving a severe test to the power equipment, the Diesel engines have proven entirely satisfactory and able to maneuver the vessel quickly at times when ice was encountered.

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CONTINUOUS WAVE
RADIO EQUIPMENT

The Frontiers of Industry

By EARL P. STEVENSON, Cambridge, Mass.

THE field for useful inventions in the arts is kept fertile by new scientific discoveries, and never more so than today, with the quickening rewards of continued attack on the very substance of matter. What new opportunities for achievement lie beyond the present frontiers of our scientific knowledge should not, however, be our only concern. The frontiers of science are further flung than those of industry; we must appreciate this fact and quicken our pace lest we pay further and greater tribute to those nations whose people have come to realize the great industrial opportunity that awaits a fuller appreciation of data already before us. We have passed through a period of epoch-making discoveries; if we are to more completely realize upon their potentialities our recourse is intensive research, wisely directed, adequately financed, and sustained in the face of obstacles. To better cope with this situation, more energy should be concentrated on the frontiers of our industries.

Possibly we are too much concerned with the evolution of industries, in effecting minor improvements in old processes, and underemphasize in our research programs the opportunities for revolutionizing our practice of these processes. Living in the midst of abundant natural resources, we are not as responsive and sensitive to the significance of certain scientific observations in affording the suggestion of a new process as certain less-endowed nations. We have so far been content, for example, in the exploitation of our petroleum reserves. But this situation will change. We are coming to appreciate more the necessity for intensive research, as opposed to the extensive.

Research, which gave to Germany her prewar monopoly of dyestuffs and to which she looks for her economic rehabilitation, is too often viewed apart as an ultra, rather than an intra, activity. The needs of research for financial support deserve recognition more on a par with the other agencies and divisions which comprise the machinery of production and distribution. In the face of mllions for advertising products by slogans in the absence of the distinctiveness in quality or utility which research alone could provide, research expenses are properly listed by the accountant among miscellaneous and sundries.

Price Paid for Failure to Recognize Value of Research.

We have already paid the price of our failure to recognize the earning power of research. But a very few years ago the American rights under the viscose patent for artificial silk went begging in this country for $50,000, and last year witnessed the production in this country of 36,000,000 pounds, valued at eighty-one million dollars, our tribute to a foreign-owned corporation that had the vision and faith necessary to finance this project through its development stages.

However parsimonious we may be in supporting fundamental industrial research, millions flow freely into the design of new and improved machinery for the operation of old processes. Examples without end could be cited where money has been liberally spent on machine design. A hundred thousand dollars to make a paper lard bucket in an automatic machine for your butcher's edification shows laudable enterprise. In the meantime, our more imaginative competitor has conceived an entirely new type of lard and ice-cream pail—a paper can formed directly from pulp, so our one hundred-thousand dollar machine is idle most of the time, and is fairly on its way to the museum.

Research Should Be Placed On a More Even Competitive Basis With Labor Saving and Mass Production Projects.

A way should be found to place research which aims to better utilize energy and materials for our daily use, and is more concerned with primary processes, on a more even competitive basis for financial support with those projects which promise a more immediate return by effecting labor saving and larger-scale operations in standard processes. This cause is undoubtedly advanced by such publicity as has been given the much-heralded new German process for making methanol from blue water gas. As the wood-distillation industry in this country faces the possibility of losing its investment—which has been estimated at $100,000,000—it at last sees the handwriting on the wall. A few years ago, it is reported, an expenditure of $8000 a year was vetoed by the directors of one of these concerns in this country. The action, from one angle, was a proper one. The sum was entirely inadequate; but a request for $50,000 a year would never have had a hearing. The scheme would have been branded as visionary, and the perusal of the current balance sheet would have continued with much discussion of accounts receivable versus those payable, for the auditor is a member in full and regular standing at these directors' meetings.

Two typical and nationally important research problems such as comprise the frontiers of our industries are the carbureting of blue water gas and the production of synthetic rubber. Instead of a guerilla attack, involving casual work here, duplication there, and general chaos, the great opportunity of organized research, ably directed, sufficiently financed and sustained in prosecution, is evident. Such an enterprise requires imagination, courage, and faith in its sponsors. It s a most attractive speculation.

The situation is a factor in the recent organization of several of our large enterprises of research corporations, directed to a more intensive study of their problems; another phase is the separately organized and privately financed research syndicate which has as its objective the establishment of a new industry through a research accomplishment. The adaptability of such latter projects to a better utilization of our natural resources is advanced for your consideration.

The initiative of such enterprises is not hampered by traditions nor fettered by short-sighted conservatism. The spirit that pushed the railroads across the last of our territorial frontiers can again function, this time on our industrial frontiers. We must speed up, and as Delmar has truly said, "Industrial research is accelerated experience."

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and daily
from San Francisco to New York
with a FEDERAL C-W RADIO SET

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Pacific Marine Review

The National Magazine of Shipping

APRIL, 1926

S. S. "MALOLO"

Largest and fastest steamship ever built in this country

Entire pumping equipment by Worthington

WHEN this crack Matson liner for the San Francisco-Honolulu run leaves Cramp's Yards, she will carry more pumps, and pumps for more different purposes than any other American merchant ship afloat. All are Worthington pumps, of course, for this organization's unequalled experience in ships' needs is backed with facilities to handle such contracts efficiently.

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Pumps for drinking water
Pumps for fuel-oil transfer
Pumps for fuel-oil service
Pumps for ballast
Bilge pumps for engine room
Bilge pumps for fire room
Pumps for washing water
Pumps for sanitary system
Pumps for lubricating oil
Pumps for boiler testing
Pumps for fire service
Pumps for ice water recirculating
Pumps for swimming-pool water recirculating
Pumps for lubricating oil coolers
Circulating pumps for lubricating oil coolers
Recirculating pumps for hot salt water system
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Also a complete Worthington Diesel engine-generator set with auxiliary equipment for emergency use.

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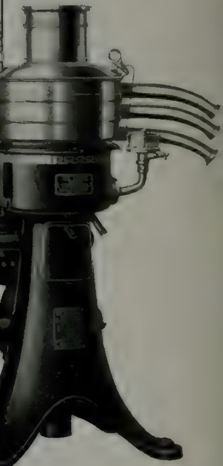
Official Organ

Official Organ
SHIPOWNERS' ASSOCIATION

Pacific Marine Review, Vol. 23, No. 4, Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

Cleaner Oil for *motorships of Panama Mail Steamship Co.*



CLEAN oil furnished by De Laval Oil Purifiers protects the Diesel engines of the motorships "City of San Francisco" and "City of Panama," operated by the Panama Mail Steamship Company.

The De Laval Oil Purifier (regular type) constantly maintains the lubricating efficiency of oil and makes it possible to keep the same oil in service indefinitely. It minimizes the cost of lubrication, while improving the service rendered by the oil.

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The De Laval Vapor-Tight Fuel Oil Purifier is built especially for the service its name denotes. Clean fuel oil minimizes wear on cylinder liners, injection feed nozzles, and fuel pumps, and removes the trouble attending the burning of oil containing water. Regardless of its previous condition, oil which comes from the De Laval Purifier is **clean.**

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Pacific Marine Review

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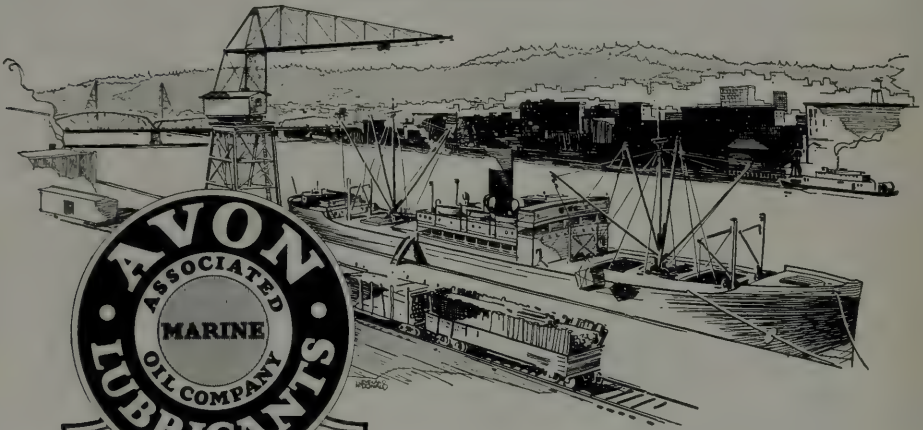

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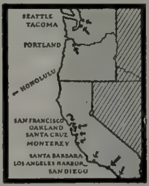

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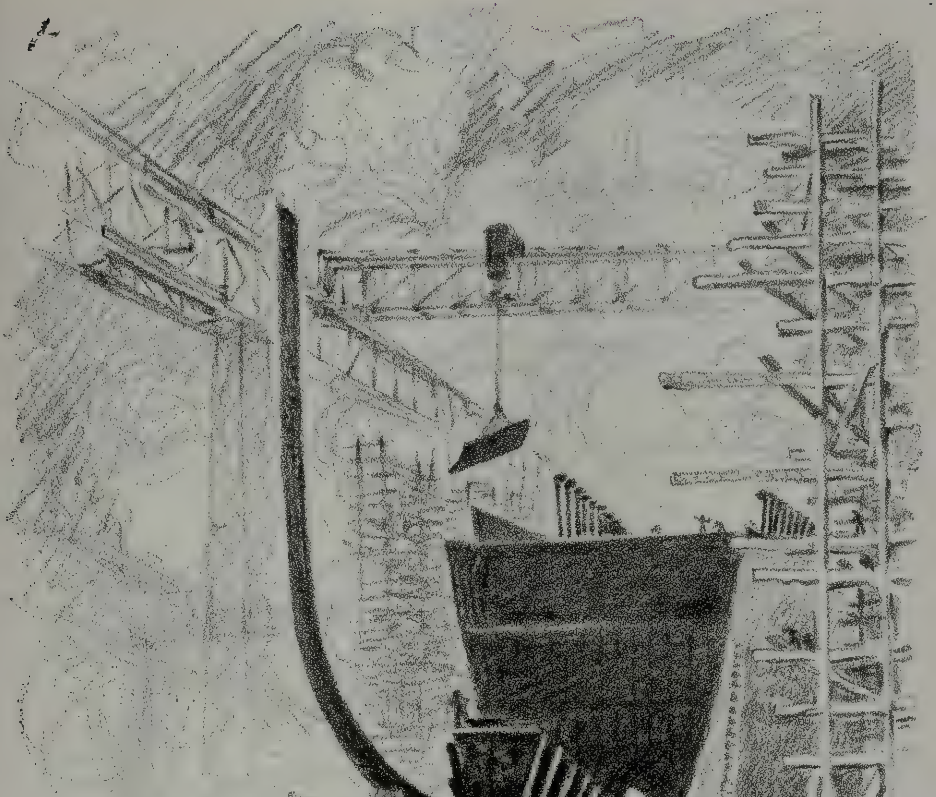

FROM A SKETCH BY CHARLES JOHNSON POST

Bow View of the Steamship Malolo on the Ways at Cramp's Shipyard, Philadelphia

"Gently the vast network of huge derricks and the towering scaffolding fades into the long perspective toward the placid Delaware. Little figures, like ants, appear and disappear amid the clutter of heavy iron, and here and there a stocky derrick grunts as it shuffles along with some massive bulk of steel casting. Over all there is the keen racketing of scores of rivet guns."

In Emergencies at Sea Trustworthy Rope Must Play a Part

THE ANTINOE, sinking in a heavy storm—crackle of wireless and a great liner speeding to the rescue—the lifeboat sent away. In such romances of the sea trustworthy Rope must play a part.

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APRIL 1926 VOL. XXIII. No. 4

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

576 Sacramento Street, San Francisco
136 LIBERTY STREET, NEW YORK
Wm. Z. Gardner, Special Eastern Representative.

Member of Pacific Traffic Association

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1924, by J. S. Hines. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Official Organ
Shipowners' Association of the Pacific

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Americans Abroad Exempted

ONE of the many hundreds of paragraphs included in the 1926 Tax Revision Bill, whose final signature by President Coolidge was recently announced, crowned a six years' campaign by the National Foreign Trade Council and American chambers of commerce abroad to relieve American citizens engaged in business in foreign countries from the provisions of the income tax.

The citizens of all foreign countries pay no income tax on incomes earned during their residence abroad, and this provision (Section 213-b-14) now places American foreign traders on a par with their competitors. Some of the classifications of Americans thus relieved from income tax, according to the National Foreign Trade Council, are as follows: exporters, importers, sales managers, and the business force generally of American firms situated in the foreign field, Americans employed in banking, insurance, accounting, freight forwarding, branch manufacturing, and assembling, engineering, foreign exchange, and similar technical work, professional men such as lawyers, doctors, and dentists, employees of shipping companies, retail and wholesale merchants, and educators.

The terms of the paragraph provide for the relief of Americans who are bona fide non-residents during six months or more of the taxable year upon income earned in the country of residence.

The National Foreign Trade Council, the United States Chamber of Commerce, the American Manufacturers Export Association and other organizations have backed this legislation for several years. The tax involved has not been large, but the irritation caused by the fact that Americans have been the only foreign traders engaged abroad who have had to pay income tax to their own government has made it difficult to secure the best type of Americans for representation in the foreign field.

Cooking Its Own Goose

EVERY settler that a money losing passenger department of a railroad carries into pioneer territory is a potential profitable patron in a freight way. Every third-class advertising message that goes into the mails is a potential breeder of letter mail; every well-placed advertisement is a creator of correspondence; and every letter is a postal profit-maker, according to the Postal Department's own figures.

Wipe out every advertisement that now goes through the mails, bar from the post office every advertising message that now carries a business talk to the remotest village or inaccessible farm, and what do you think would happen to the vast volume of profit-making first-class mail?

The postal administration of every country under the sun, except the United States Post Office Department, knows the value of mailed advertising and encourages it accordingly. That is why you find some of those inexplicable differences between what is permissible in our foreign mails and what is forbidden in the domestic mails.

Why do you think it is that you may send your circulars to every land in the world for 1 cent for 2 ounces, but must pay 50 per cent more to reach your prospects at home? It is because all other countries know the value of the printed circular and form letter as a builder of profitable postal business, and, therefore, have engrafted this principle in the Universal Postal Treaty, and our Post Office Department has had to bow to this common-sense practice in dealing with the people of other lands. We certainly dislike to consider the prospect of the Department "cooking its own goose" by driving third-class matter from the mails.

(Otto Praeger, Former Asst. Postmaster General.)

Opening Up the Fijis

FROM "long pig" to golf courses in the space of 90 years is the record of the latest tourists' mecca opened up, on regular service, to American globe trotters. Suva, Fiji, is now a regular port of call for the vessels of the Oceanic Steamship Company plying between San Francisco and Australia.

When Wesleyan Methodist missionaries set foot on the islands in 1835 they found a very pronounced taste for human flesh on the part of Fiji hosts who aspired to spread a really sumptuous repast for their friends.

Now, we are told by Foreign Commerce Department of the National Chamber of Commerce, stores, golf courses, race tracks, schools, and churches, plus a very modern hotel, have sprung up in this erstwhile scene of the famous "long pig" barbecues.

Nor is the tourist the only one expected to profit by this regular service. Despite the absence of regular liners to Fiji, American manufacturers have been finding in the islands a worthwhile market for boots and shoes, dry goods, hardware, lamps and lamp ware, agricultural machinery, electrical machinery, oil engines, box shooks, kerosene and gasoline, and last, but not least in the eyes of the Fijians, motor cars, 18 American cars being purchased in the year 1923. The plantation owners of the islands doubtless see, in this regular service, an expanding market in the United States for their products.

The Ocean Bill of Lading

An Analysis of the Present Status of Bills of Lading in Relation to the Harter Act and the Hague Rules of 1921

Norman F. Titus, Manager, Claims—Insurance,
McCormick Steamship Company.

BILLS proposing modifications in the ocean bill of lading have been before Congress during the last few sessions. Furthermore, there has been considerable agitation on the part of the press for a change. Likewise, marine underwriters, bankers, and associations of business men have urged Congress to take action. The question naturally arises as to the cause of this movement and just what results have been accomplished to date. The answer is found in a brief survey of the history of the ocean bill of lading and the causes of complaint registered against it.

The Genesis of the Bill of Lading.

In the early centuries of the Christian era it was customary for merchants or their agents to travel with their own goods. Under these circumstances all that was necessary was to register or list the goods with the master of the ship. Gradually, however, merchants discontinued the practice of accompanying their goods, and, accordingly, a receipt for the cargo became necessary. Thus, the original bill of lading was nothing more or less than a receipt. This use of the bill of lading was well established by the sixteenth century. During the next two hundred years a method was evolved of issuing bills of lading in duplicate or triplicate, thus providing a document for transferring title of the goods to the consignee. Moreover, the consignee might resell what he had bought before its arrival; and so the practice of transferring the property in the goods by endorsing the bill of lading came into general use. This was the function of the bill of lading by the close of the eighteenth century.

Development of the Clauses.

Up to this time it seems quite certain that bills of lading contained but one clause or exemption; namely, "the dangers of the sea excepted." No further clauses were added until after 1795, when shipowners in England became alarmed by a legal decision as to the extent of their liability. They endeavored to obtain relief from Parliament. Failing in this, they met the situation by altering the form of the ocean bill of lading by introduction of clauses to offset the adverse judicial decision. As other decisions opposed to their interests were encountered, or new operating conditions arose, they added still other clauses. Through these influences the number of clauses in bills of lading has multiplied greatly. At present, the average shipper despairs of fully understanding the conditions in the fine print and wonders if the shipowner legally bears any burden whatsoever.

Further Reasons For This Complication.

The shipowners' attitude was also influenced by the fact that they had become more and more dependent upon stevedores over whom their control was slight. Furthermore, with the development of mechanical devices, it became increasingly difficult for the ship's officers to check weights or numbers of commodities; ships increased in size and their cargoes became more and more varied; and, with the development of the business, the field was broadened until the ship became merely one link in the chain of the transportation service.

With the development of ocean transportation, the owner faced two methods of handling: (1) He could assume full responsibility for all losses while goods were in his possesion; or (2) He could offer his services with the understanding that he would exercise due diligence in carrying or delivering the goods, but would assume no financial responsibility if the goods were lost or damaged.

If he had adopted the first course he would have had to base his freight in part on the value of the goods, as he would, in reality, be insuring them as well as transporting them. In the second course, he could fix his rates with regard to weight and bulk of the goods carried, leaving the merchant free to insure himself against loss. The second course was forced by the general conditions of the trade and, consequently, the shipowner has acted aggressively to strengthen the clauses relieving him of liability.

Countries Allowing Freedom of Contract.

This state of affairs is best illustrated by the situation as it existed in England until a year ago. There, under the common law, the shipowner was responsible for the safe carriage and delivery of goods committed to his charge as a common carrier, unless prevented by certain definite causes—such as the Act of God or the King's enemies clauses. There was nothing in English law to stop him from contracting out of the whole or any part of his liability. From 1880 until recently, the British shipowners in their bills of lading habitually contracted themselves to a large extent out of their common law liability. A great many British shipowners, however, paid reasonable claims, although not obligated to do so under the terms of their bills of lading.

Very much the same legal situation as has prevailed in the United Kingdom, has existed in France, Sweden, and Norway.

Countries Prohibiting Negligence Clauses.

In America, freedom of contract for the carriage of goods by sea was narrowed by judicial decision; however, shippers, especially during the period of 1870 to 1893, had many bitter experiences. With the passing of the clipper ship and the advent of the iron ship, Americans had to depend upon foreign shipowners, principally British, to transport their goods. The exemption of liability, even when negligence was present, that existed in the bills of lading given by these foreign carriers worked a great hardship on the shipper. Eventually the situation became almost intolerable.

At the insistence of American shippers, Congress took action to protect them, and in February 13, 1893, passed the Harter Act. It has been generally supposed by the public that the Harter Act was passed as an aid to shipowners, but on the contrary the act was designed to curb the insertion, by shipowners, of clauses exempting them from liability. Such clauses were definitely prohibited.

In Australia, New Zealand, and Canada, acts have been passed resembling the Harter Act in their general features. In Japan, Article 592 of the Commercial Code provides that "Even by express agreement a shipowner cannot exempt himself from his liability for damage caused by his fault, or by the serious fault of a seaman, or of any other person employed, or by the unseaworthiness of the ship."

The Harter Act.

The Harter Act, while exempting a shipowner who exercised due diligence to make his ship seaworthy from liability for damage or loss resulting from what may be shortly described as navigation risks, prohibits him from inserting in any bill of lading or shipping document any clause relieving him from liability for what may be termed carrier's risks. The events for which the carrier is relieved by the Harter Act are as follows:

(a) Faults in care of cargo, or errors in navigation or management of the vessel.

(b) Perils of the sea or other navigable waters,
Acts of God,
Acts of public enemies,
Inherent defects, quality, or vice of the thing carried,
Insufficiency of package,
Seizure under legal process,
Loss from any act or omission of shipper or owner of the goods,
Saving, or attempting to save, life or property at sea.

The Supreme Court has held that Section 3 of the Harter Act does, in itself, not relieve the shipowner from the warranty of seaworthiness, but authorizes him to reduce the absolute warranty by contract, to one of due diligence. Accordingly, although the exemption is not founded in the words of the act, the shipowner may contract against loss and damage arising from:

(c) Latent defect in hull or machinery existing when the voyage commenced but not discoverable by due diligence.

There is nothing in the Harter Act to prevent a carrier from stipulating against miscellaneous causes of damage arising in the ordinary course of transportation, but the Harter Act holds him to liability where there has been any failure in the care and custody of the cargo or failure to use due diligence to make the vessel seaworthy. The advantage to the shipowner of these stipulations is that they shift to the cargo owner the burden of proof in establishing the fault of the vessel.

Valuation Clauses or Limitation of Liability.

Although the Harter Act purports to render it illegal for shipowners to contract out of their liability for loss of, or damage to, goods, nevertheless, the courts have held that it was permissible for a carrier of goods to agree with a shipper upon the valuation of the property carried, so that the carrier assumes liability only to the extent of the agreed valuation. This clause in most bills of lading limits liability to invoice value, but not to exceed $100 on each package.

Attachment of the Harter Act.

The shipowner may not claim the exemption of Section No. 3 for losses and damages caused by error in management until after the vessel has actually sailed. The fact that the vessel may be fully loaded and ready to sail is not sufficient. Furthermore, the exemptions of the Harter Act apply until the cargo is discharged from the vessel.

The Jason Clause.

As typifying in American bills of lading the introduction of exempting clauses to offset adverse judicial decisions, attention might be called to what is known as the Jason clause. This was introduced into the bill of lading for the following reasons:

Previous to the Harter Act, in case a general average situation had resulted from the negligence of master or crew, the ship was debarred from recovery and had to indemnify the cargo for any loss it had suffered. It was at one time thought that the Harter Act had cancelled the fault of the shipowner in case of errors in management and navigation and that, even without an express stipulation, the owner in such cases would be treated as if negligence of his servants had not caused or contributed to the loss. This view was held erroneous by the Supreme Court in the case of the Irrawady. As a result of this adverse decision, a clause was introduced into bills of lading providing that in cases of general average, resulting from faults or errors in navigation or from failure to make the ship seaworthy, providing due diligence had been used, the cargo owners should contribute in general average with the shipowner. In the case of the Jason, cargo owners contested this for eight years in the courts when the Supreme Court found the clause valid, and it now appears in practically all bills of lading and is universally known as the Jason clause.

The Hague Rules of 1921.

One of the results of the World War was the interjection into world trade of large numbers of more or less inexperienced owners and traders. This resulted in heavy losses to all, including bankers and underwriters. These conditions accentuated the great need for an adequate international bill of lading approved by all parties, shippers, owners, bankers, and underwriters.

After much discussion and appointment, even, of governmental committees, principally in England, the matter centralized in the Maritime Law Committee of the International Law Association, the body that had been so successful in formulating the York-Antwerp Rules governing general averages. This committee finally produced a draft code in July, 1921, and after many meetings between the various groups interested, a conference was called at The Hague in September, 1921. At this conference the grievances of all parties were aired, with the result that compromises became necessary, principally on the part of the shipowners.

The cargo interests had four main causes for complaint

(1) That bills of lading limited liability to amounts of $100 or less per package.

(2) That carriers had unfairly evaded the payment of just claims by bill of lading stipulations requiring claims to be presented within an impossibly short period.

(3) That carriers had evaded the payment of claims for pilferage and similar losses, and had even encouraged such losses by casting an impossible burden of proof upon cargo owners.

(4) That carriers had improperly stipulated in their bills of lading for the benefit of insurance effected by the shippers.

These were the main points at issue, and when re-

(Continued on Page 58)

High Pressure Steam in the Marine Power Plant

Some Features of the Problems Involved in the Introduction of High Pressures, High Temperatures and High Superheats in the Propulsion Plant of Ocean Going Steamers

By G. E. Kershaw.

NOT so long ago the average marine engineer felt considerable satisfaction in operating his plant at say 110 pounds pressure and viewed with alarm the introduction of any higher pressures. Today, he exhibits no concern in dealing with pressures twice that and sees in the near future the possibility of being called upon to operate at steam pressures that have again doubled and with that steam at a temperature that causes a bare pipe conveying it to glow in the dark.

Very naturally we speculate upon the nature of the steam plant of tomorrow which will more nearly approximate the fuel economy of the internal combustion engine than does that of today. What changes will occur in our steam generators, prime movers, auxiliaries, and pipe lines to meet the demands of higher pressures and temperatures? Inasmuch as commercial boilers have been built for working pressures of 1200 pounds and as high as 1500 pounds, with provision for steam temperatures up to 750 degrees Fahrenheit, a consideration of some of the features of such an installation adapted to marine propulsion may prove of interest. Perhaps such pressures may seem radical. If so, it should be borne in mind that power plants operating at pressures from 350 to 450 pounds and total temperatures of 750 degrees are becoming common while oil still work involves temperatures of 850 degrees.

The Boiler.

Semi-vertical or horizontal water tube sectional boilers seem to be best adapted, bearing in mind the prime importance in either type of the elimination of temperature differences, tending to set up undue stresses and the need for maximum efficiency in circulation. For very high pressures we would have one piece drums of forged nickel steel, research having revealed that plates are weaker along their edges than in the middle, and it is along these edges that riveting occurs. While the horizontal boiler has the advantage of straight tubes between the headers it would appear that the multiplicity of hand holes would be undesirable in high pressure work, more especially as being relatively smaller, a greater number of these tubes would be required for equal heating surface.

While pulverized fuel has been used to a considerable extent in individual plants, the present state of the art and the large furnace volumes desirable, would probably preclude its use aboard ship in the very near future. Oil firing, with its flexibility of adjustment, steady heat, and the ability to cut out fires almost instantly, presents a most satisfactory means of raising steam. Maintenance of constant steam pressure would become of very great importance. With the small steam space afforded by the drums, the pressure drop in a high pressure boiler due to even the short interval required to replace a burner tip is startling. One feature, sometimes found in high pressure plants, the steam-accumulator, would probably not be required in marine work. This accumulator, by storing high pressure steam in water, provides for fluctuating loads.

Pure boiler feed water is always desirable; in high pressure boilers it is essential. Not only must the boiler be kept as free from scale as possible; but the superheater tubes should receive like consideration, uniform superheat, as well as uniform pressure, being essential. With high steam velocities, any impurities carried through the superheater become harmful to turbine blading and contributory to the resulting loss in turbine efficiency.

Gauge Glass and Safety Valve.

The items of gauge glasses and safety valves require some thought in connection with the higher pressures. In some boilers an indirect water column has been utilized. This consists of a U tube connecting with the steam and water spaces, the lower portion of the tube being filled with mercury. Water gradually filters over from the steam space on top of the mercury and excludes the steam. Safety valves on every high pressures should not lift as at present with the lower pressures; i. e., frequently. To prevent this, a pilot valve could be installed to warn the fire room of the close approach to maximum pressure.

Superheaters.

Superheaters, aside from increasing the over-all efficiency of a high pressure installation, serve to eliminate a water surge in piping that would prove dangerous. Experience has demonstrated that, by locating superheater units between or near the first bank of boiler tubes, the superheater is subject to the same variation of gas temperatures as is that part of the boiler in which most of the steam is generated — a condition much to be desired. Locating the superheater units in such high gas temperatures is entirely safe, as the density of high pressure steam insures an ample cooling effect on the walls of the units.

The headers and unit joints of the superheater would be placed outside of the boiler setting to facilitate inspection and adjustments. Joints that have met with much success in high pressure work have been made with integral ball ends on the units, these being held to their seats in the headers by clamps, the studs for which are of special heat treated steel. Thus, a highly satisfactory metal-to-metal joint is effected.

Research in connection with high pressure-high superheat development has brought out certain facts not generally appreciated. For instance, it has been found that the wall temperatures of pipes depend on the velocity as well as the temperature of the steam. Heat radiation losses appear to be little influenced by the diameter of the pipes. Pressure drop in pipes carrying superheated steam has been shown to be less than that in pipes carrying saturated steam. Decrease in the velocity of superheated steam in pipes decreases the coefficient of heat transmission. By providing for a steam velocity through the superheater sufficiently high to produce a cleaning effect, the temperature of the unit wall is held more nearly to that of the steam.

Fittings.

Due to the higher velocities in pipes carrying superheated steam than in those carrying saturated steam, more steam can be passed under the former conditions than under the latter, with a consequent smaller heat loss per unit weight. As the bulk of pressure drop in steam lines occurs in fittings, bends, and valves, these should naturally be reduced to a minimum number. Smaller pipes being used for high pressure steam it is not difficult to keep joints tight. In this connection, it may be said that while copper gaskets were used in early experiments and are still used, Klingerite has been found to serve very satisfactorily.

To eliminate sudden changes of direction of steam flow in high pressure lines long radii bends and gate valves should be used. Instead of the radii of bends being determined by pipe diameters, they would be governed by steam pressures and the valves would be provided with seats having as nearly as possible the same coefficient of expansion as the bodies of the valves. Acid electric furnace steel has been found to be very satisfactory for valve bodies in high pressure-high temperature work.

The boiler feed pumps will be of the electrically driven centrifugal type, these also furnishing a means of draining the main steam lines when warming up, the pipe drains being connected to the pump. By connecting to different stages of the pump the line can be steadily drained as the pressure rises to maximum. One disadvantage of this arrangement is that it is not entirely automatic, but it serves to eliminate steam traps which are apt to be troublesome in high pressure installations.

Main Engines.

In the matter of prime movers we have the turbine, in which the lower stages are the most efficient, and the reciprocating engine, in which conditions are reversed, the high pressure cylinders being the most efficient. With the reciprocating engine the relative inefficiency of the low pressure cylinders often leads to the use of the so-called "exhaust turbine" for pressures below that of atmospheric.

If turbines with very high initial pressure are employed, steam is first led to a separate unit from which it is exhausted to another lower pressure unit, this latter taking the form of the usual compound turbine. As the common type of feed water heater would hardly serve such an installation, recourse is had to regenerative heating in which steam is bled from the several stages of the turbine to heat the feed. This matter of regenerative heating of the feed and the reheating of the steam between various stages presents an interesting study. The limits of this article, however, will hardly warrant a discussion of the means employed or suggested to utilize these cycles separately or simultaneously. It may be of interest to note that when reheating with an initial pressure of 1200 pounds it would be desirable to reheat at about 400 pounds, and again at 60 pounds, passing the steam back through the reheaters which may form part of the boiler installation or consist of separate units either individually fired or obtaining steam direct from the boiler for reheat.

In the case of reciprocating engines using high initial pressure the cylinder sizes very naturally are much reduced as compared with the lower pressure engines. The extent of this reduction may be noted from two engines doing the same work, one with an initial pressure of 213 pounds and a 26-inch diameter cylinder, the other with a pressure of 852 pounds and a 14-inch diameter cylinder. Owing to the reduction in moving masses in the high pressure engine there will not be the excessive stresses in connecting parts that might be expected, the increase in the above instance having been found to be approximately 35 per cent. The weight of the high pressure unit, moreover, will be found to be materially less than that of the lower pressure engine. As with the turbine, it becomes desirable to reheat the steam in the high pressure reciprocating engine. In a quadruple expansion engine this reheating may best be effected at the second and again at the last cylinder.

Rod Packing.

For rods and stems, self lubricating metal packing has been found to be well adapted for high pressures, asbestos rings being inserted between the metal sections. High grade cast iron snap rings have also served for high pressure pistons, while piston valves have been found to function as well as, or better than, poppet valves. Proper internal lubrication will of necessity be a vital factor in satisfactory operation as well as an effective oil filtration. Owing to the high temperatures in the high pressure cylinders, oil atomization, in conjunction with direct internal lubrication, will be found to meet the requirements.

Economies.

While the introduction of high pressures and high temperatures will introduce new problems, it will be of interest to know what sort of return may be expected. Exhaustive experiments have shown that in a quadruple expansion engine with steam at an initial pressure of 800 pounds, and temperature of 815 degrees Fahrenheit, vacuum of 28.5 inches and steam reheated above the second cylinder to 600 degrees Fahrenheit, and above the last cylinder to 400 degrees Fahrenheit, one horsepower was generated on 5 pounds of steam. Again, with a similar engine, using steam at 850 pounds and 750 degrees Fahrenheit, the evaporation was 5.8 pounds per one horsepower hour on .8 pound of coal or .57 pound of oil.

Figures from central stations show that with steam at an initial pressure of 600 pounds and 750 degrees Fahrenheit a horsepower can be delivered on .69 pound of oil. What part electricity will play in engine room equipment of the future, one may not predict with certainty, but present indications are that its ever increasing economy of production will make it a factor to be reckoned with in the matter of main units, as well as auxiliaries. Much has already been accomplished in extending the field of the electrically driven auxiliary and much more remains to be accomplished in the treatment of this subject, in view of the constantly growing demands on the boilers, chargeable to auxiliary steam.

That the possibilities of steam generation and utilization in prime movers have by no means been exhausted is shown by almost daily developments in engineering. In reviewing the increase of pressures, temperatures of 700 to 750 degrees Fahrenheit have been used for several years whereas the increase of pressures has been more gradual. In this connection, it will be borne in mind that increase in superheat yields a relatively larger return than does an increase in pressure.

Looking back at the strides made during the past decade in power plant engineering, both ashore and afloat, one cannot but view with great interest the experiment now being worked out overseas.

Marine Fuel Conservation, I

A Summary of the Manual Issued by the Fuel Conservation Section of the Emergency Fleet Corporation, Together with a Foreword by the Chairman of the Section

The fundamental idea of the work of the Fuel Conservation Section of the United States Shipping Board Emergency Fleet Corporation is to reduce the fuel cost of operation to a minimum, and keep it at this low point.

Machinery in carrying out this work will touch on many of the phases of operation, chief of which however is personnel; as after all the results obtained must necessarily be obtained by the men who are actually running the ships. This means care must be taken in the selection of personnel and that a system of training and education must be carried on continuously.

It is an inherent fact that Americans like competition and this applies also to the marine engineer. He wants to produce results just a little bit better than the other fellow. This fact therefore has made the introduction of the fuel conservation scheme comparatively easy. However, when competition starts there must be rules laid down so that it will be a fair fight. With this in view the Manual of Instructions for Engineer Inspectors of the Fuel Conservation Section has been drawn up. In this manual an attempt has been made to cover the variables that affect operation.

However, in applying the rules of the manual good common sense has to be exercised at all times because fuel conservation work, like everything else connected with the sea, has such a wide horizon that it cannot be confined within a set of book covers.

C. J. JEFFERSON,
Chairman, Fuel Conservation Section.

REPRODUCED herewith appears a facsimile of Sheet No. 1 of the voyage report form issued by the Fuel Conservation Section of the Emergency Fleet Corporation to its engineer inspectors. From the reports turned in on this form the engine room staffs of Shipping Board steamers are rated for efficiency, and those who are above the standard are given honorable mention or placed on the Honor Roll.

The data recorded on this first sheet of the report are intended to present an entirely unprejudiced and unbiased picture of the actual physical condition of the vessel and her machinery at the close of the voyage on which report is being made, and also of the personnel of the engine room staff. This sheet contains also a chart of the voyage and a summary of fuel consumption.

Unbiased Reports

In the manual issued with these reports inspectors are instructed as follows:

"No personal friendships or animosities or other prejudices should influence the inspector in any way in making out his report. He should board the vessel with an entirely open mind and report conditions exactly as he finds them, regardless of any previous opinions. The greatest care must be taken in obtaining true performance data for the voyage and in computing the various factors required to determine the vessel's rating. It may be easily understood that if upon consulting these reports they are found to be inaccurate and misleading and unreliable, confidence in them will soon be destroyed. The governing thought to be borne in mind is, therefore, that the value of the report depends upon its accuracy."

Although most of the items called for in the report form are self-explanatory, the manual gives specific detailed directions for filling in each blank. In the design data section, special attention is directed to the value of carefully checking up propeller data, especially the pitch. Diameter of propeller is also important, as the minimum draft for standard performance ratings is the propeller diameter multiplied by 1.1. Date of last dry-docking is another important factor bearing on performance rating.

Horsepower Data

Data from two separate sets of indicator diagrams are to be entered. The first set is to be from cards taken during the first part of the longest stretch on the voyage under inspection, and the second set from cards taken near the end of the voyage. The inspector is directed to work out data from several sets of cards, and is cautioned to make sure that all necessary data are entered on cards before accepting them from chief engineer. A planimeter is to be used for working out the area and the mean effective pressure, and specific directions for its use are given. The engine constants for any of the standard plants are provided in tables and charts furnished the inspectors by the Fuel Conservation Section.

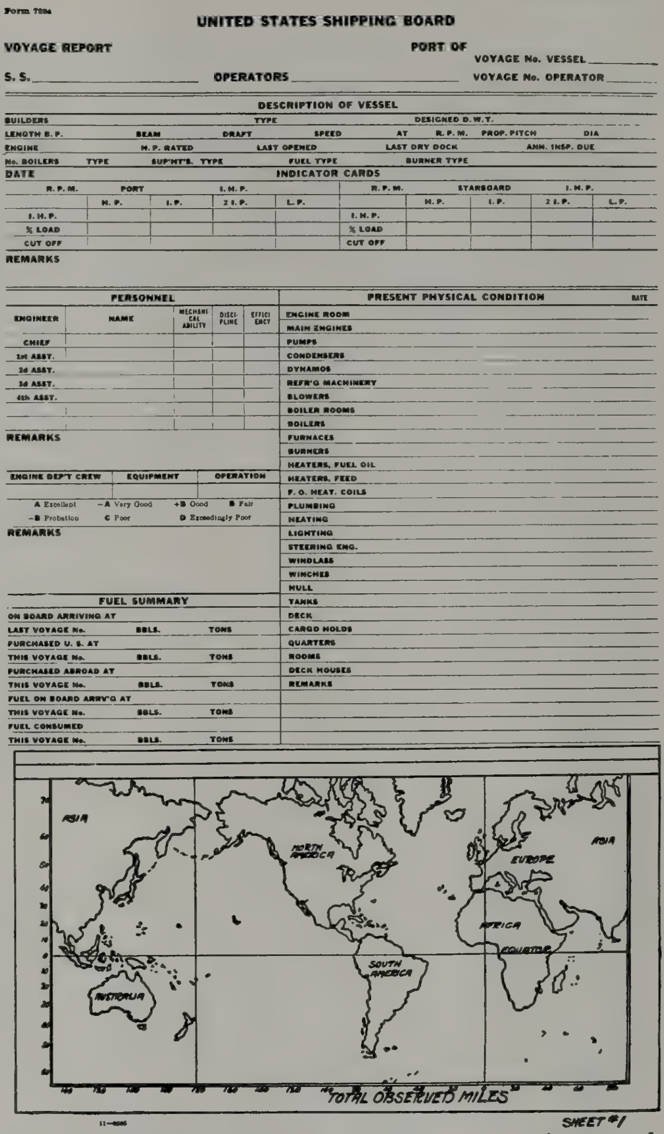
Inspectors are directed to check up from cards the distribution of load on the cylinders and the setting of links for cut-off percentage.

Through consultation with the chief engineer and through painstaking personal investigation, the inspector should learn and report the exact physical condition of all parts of the power plant and should report at length on the reasons for any defects and on the condition of stores and spare parts.

Personnel

Under the item "Personnel," duties and ratings of engineers are defined as follows:

For the column "Mechanical Ability," the engineers are rated according to the mechanical ability which they demonstrated during the voyage. The chief engineer should be questioned as to his opinion of the



Form [illegible]

UNITED STATES SHIPPING BOARD

VOYAGE REPORT

PORT OF

VOYAGE No. VESSEL ____

S. S. ____

OPERATORS ____

VOYAGE No. OPERATOR ____

DESCRIPTION OF VESSEL

BUILDERS		TYPE		DESIGNED D. W. T.			
LENGTH B. P.	BEAM	DRAFT	SPEED	AT	R. P. M.	PROP. PITCH	DIA
ENGINE	H. P. RATED	LAST OPENED	LAST DRY DOCK	ANN. INSP. DUE			
No. BOILERS	TYPE	SUP'HT'R. TYPE	FUEL TYPE	BURNER TYPE			

DATE

INDICATOR CARDS

R. P. M.	PORT	I. H. P.			R. P. M.	STARBOARD	I. H. P.		
	H. P.	I. P.	2 I. P.	L. P.		H. P.	I. P.	2 I. P.	L. P.
I. H. P.					I. H. P.				
% LOAD					% LOAD				
CUT OFF					CUT OFF				

REMARKS

PERSONNEL

ENGINEER	NAME	MECHANICAL ABILITY	DISCIPLINE	EFFICIENCY
CHIEF				
1st ASST.				
2d ASST.				
3d ASST.				
4th ASST.				

REMARKS

ENGINE DEP'T CREW	EQUIPMENT	OPERATION

A Excellent — −A Very Good — +B Good — B Fair

−B Probation — C Poor — D Exceedingly Poor

REMARKS

FUEL SUMMARY

ON BOARD ARRIVING AT		
LAST VOYAGE No.	BBLS.	TONS
PURCHASED U. S. AT		
THIS VOYAGE No.	BBLS.	TONS
PURCHASED ABROAD AT		
THIS VOYAGE No.	BBLS.	TONS
FUEL ON BOARD ARRV'G AT		
THIS VOYAGE No.	BBLS.	TONS
FUEL CONSUMED		
THIS VOYAGE No.	BBLS.	TONS

PRESENT PHYSICAL CONDITION

	RATE
ENGINE ROOM	
MAIN ENGINES	
PUMPS	
CONDENSERS	
DYNAMOS	
REFR'G MACHINERY	
BLOWERS	
BOILER ROOMS	
BOILERS	
FURNACES	
BURNERS	
HEATERS, FUEL OIL	
HEATERS, FEED	
F. O. HEAT. COILS	
PLUMBING	
HEATING	
LIGHTING	
STEERING ENG.	
WINDLASS	
WINCHES	
HULL	
TANKS	
DECK	
CARGO HOLDS	
QUARTERS	
ROOMS	
DECK HOUSES	
REMARKS	

"TOTAL OBSERVED MILES"

SHEET #1

mechanical ability of his assistants. Ordinarily the chief engineer distributes the authority and duties in his department so as to act in a superintending capacity himself. The first assistant is the active or working head of the entire department and is specifically charged with the work on the main engine. The second assistant is specifically charged with the work on the boilers, boiler room pumps and apparatus and tanks. The third assistant is specifically charged with the engine room pumps and auxiliaries, and deck machinery, if there is no deck engineer. In assigning marks, this division of responsibility must be borne in mind. The mere fact that an engineer is known to have served his time in the shop and is a good mechanic is not sufficient to assure him of an "A" mark for mechanical ability. He must have demonstrated his ability by the condition of the machinery under his charge, which must show proper and intelligent care.

In the column "Discipline," the engineers are rated according to their ability to handle men, and also with regard to their own personal discipline and conduct. A chief engineer, to merit an "A" rating for discipline must be a good, fair minded executive, sober and industrious, as demonstrated by a smooth running, orderly department.

The first assistant, as working head of the department and in charge of personnel, must have demonstrated his ability to keep the crew at their duties during the voyage and to properly plan and lay out the work to be performed. The condition of the boiler room and boilers will indicate how the second assistant handled his men. The third assistant, who is not vested with as much authority as the others, is usually rated for discipline according to the observations of the chief. Going ashore with the crew and mingling with them is an act of poor discipline on the part of the licensed engineers. Insobriety and unreliability in port, desertion, lack of cooperation, and insubordination are all marks of poor personal discipline.

Efficiency

In the column "Efficiency," the engineers are rated according to the economical results obtained on the voyage, with due regard for existing conditions. Broadly speaking, an efficient engineer may be defined as one who obtains the maximum and most economical results from his plant and personnel, under the various operating conditions encountered on the voyage, while maintaining his department in the best possible condition, at low expense.

Repairs: Long voyage repair lists are ordinarily due to neglect, careless operation, or failure to keep up with the work of the department during the voyage. Repairs abroad reflect particularly unfavorably upon the engineers and operators when they consist of items which should have been taken care of at the home port before starting on the voyage.

Use of Ship Machine Tools: A vessel which has a machine shop is expected to use it to advantage, and numerous items on the repair list which could have been taken care of by the ship's force with the machine tools on board, are inexcusable. On the other hand, vessels not equipped with machine tools must necessarily have their machine work done ashore.

(To be continued)

The Isherwood System

THE annual progress returns for the Isherwood system have produced some remarkable figures in past years, and even following the boom period of 1921 have marked a steady advance each year, as the undermentioned table shows:

Year	Number of ships built or under construction.	Deadweight carrying capacity.
Sept. 1907 to Dec. 1908	6	31,608 tons
1909	36	212,992 tons
1910	76	484,752 tons
1911	140	958,795 tons
1912	240	1,777,348 tons
1913	270	1,993,034 tons
1914	311	2,351,322 tons
1915	468	3,548,221 tons
1916	620	4,666,000 tons
1917	800	6,332,150 tons
1918	1,050	8,707,700 tons
1919	1,260	10,594,700 tons
1920	1,395	11,962,400 tons
1921	1,418	12,032,400 tons
1922	1,431	12,101,890 tons
1923	1,443	12,174,490 tons
1924	1,472	12,408,700 tons
1925	1,502	12,649,730 tons

Quite a number of large oil tankers were contracted for during 1925, and it is interesting to observe that—in addition to the nine 12,000 and 15,000-ton tankers reported at the end on 1924—the Standard Oil Company (N. J.), has contracted for four more, of 12,000 tons deadweight carrying capacity each, three to be built in Germany and one in Italy. As in the case of the previous contracts, these vessels are to be fitted with diesel motors, and it might here be mentioned that one of the many advantages obtained is the increased rigidity of the hull structure due to the Isherwood system, which is invaluable in the case of motorships.

A special type of ship, for which the Isherwood system proves to be greatly beneficial, is one at present building by Italian builders for the transportation of heavy weights.

The advantages of the Isherwood system and its success are too well known to need further mention. In the case of an oil tanker on the Isherwood system, the longitudinals at the sides, bottom, and deck of the vessel, as well as the longitudinal stiffeners on the center line bulkhead, are all stopped at the transverse bulkheads and bracketed thereto through the medium of the horizontal stiffeners on the transverse bulkheads. This system, with its more scientific distribution of stresses, dispensing as it does with the large bulkhead brackets of the old transverse system, greatly minimized, if indeed it did not almost suppress, the leakage at the bulkheads. This result, however, was achieved only at some expense, which on the other hand was considerably more than counterbalanced by the great economies effected in other directions.

Still, brackets are brackets, and after considerable investigations Sir Joseph W. Isherwood, Bt., the inventor of the Isherwood system, has now introduced an improvement on his system which has for its primary object the elimination of the bulkhead brackets, and so to obviate all possibility of leakage at this point, while at the same time maintaining the continuity of longitudinal strength. This system by virtue of its intentions has become known as the Bracketless System.

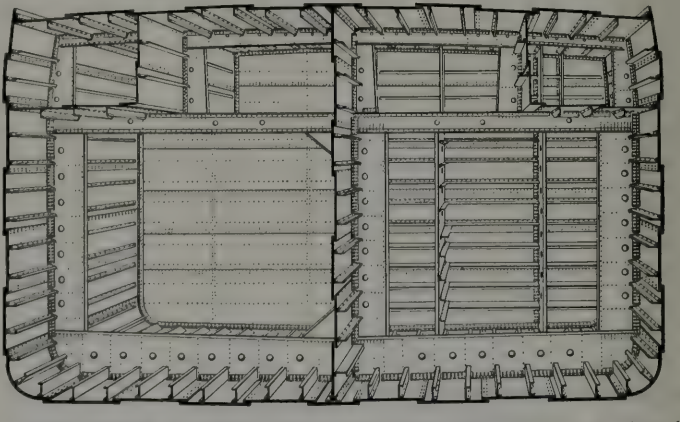
The bracketless system, as applied to a tanker, is the conventional Isherwood system, but without any brackets whatsoever in the oil tanks. In discarding the brackets the strength of the structure is maintained by a most ingenious distribution of scantlings and materials.

The spacing of the side longitudinals and the horizontal stiffeners on the bulkheads, which are now supported by the transverses and webs, is retained as in the Isherwood system, but it is obvious that if the distance between two transverses or webs be increased, so that the projecting end portions of longitudinals or horizontal stiffeners are reduced in length and the supporting brackets dispensed with, some compensation is necessary, and this is found in shell longitudinals and bulkhead stiffeners of substantially increased size and weight, the strength of the projecting end portions being the same, or substantially the same, as the portion between two transverses or webs.

Due to the heavier scantlings of the shell longitudinals, the longitudinal strength between bulkheads as compared with the Isherwood system is increased, and the full continuity of longitudinal strength is maintained by fitting doubling plates of suitable dimensions at all strakes of the bottom shell in way of the transverse bulkheads, and also in way of all outside strakes of the side shell and decks.

As compared with the Isherwood system, which is the recognized standard for oil tankers, no saving in

(Continued on Page 59)



A sectional perspective of the midship section of a large ocean-going tanker, built on the new Isherwood bracketless system, as described in the accompanying text.

MALOLO Herald of a New Era in Pacific Ocean Passenger Travel

OPENING a new era in luxurious and swift passenger travel from San Francisco to the Hawaiian Islands, the new Matson express liner Malolo, now building at the Philadelphia yard of William Cramp and Sons Ship and Engine Building Company, and to be completed in the spring of 1927 heralds a great advance in the Matson line's passenger service.

Since the Matson Navigation Company was founded in 1882 by the late Captain William Matson, the policy of the company has been to build its ships as combination freight and passenger carriers. Starting with one 200-ton sailing vessel the Emma Claudina in 1882, Captain Matson acquired other sailing ships, these carrying a few passengers, but chiefly designed for freight service. One of his earliest vessels, the Matson bark Harvester, carried ten passengers and sailed the distance to Hilo in seventeen days. The Malolo will carry 650 passengers, all first-class, to Honolulu in four and one half days.

As the growing commerce of Honolulu necessitated faster and more regular service, Captain Matson changed from sail to steam. His steamers have always been designed to carry 8000 to 10,000 tons of cargo each and from 100 to 250 first class passengers. The passenger steamers Lurline, Manoa, Wilhelmina, Matsonia, and Maui have all been built in accordance with this policy. The Maui, present flagship of the fleet, completed in 1917, is the largest and finest example of this type of ship.

With the Malolo, however, the company has departed from its previous policy, for this palatial liner is primarily a passenger ship intended for the highest class of travel. The Malolo will establish a new standard for comfort and speed in passenger service from San Francisco to Honolulu. The ship's appointments and equipment will represent the latest in marine architecture and engineering.

Captain Matson's present passenger fleet was built with the idea of possible conversion to transports in in time of war. The Wilhelmina, Maui, and Matsonia proved ideal for this service during the World War and carried many troops to France and back. Their large fuel oil capacities enabled them not only to steam across the Atlantic and back without refueling, but also to supply oil to destroyers in mid-Atlantic. The Wilhelmina was particularly adapted to supply oil to destroyers at sea. The Malolo has been planned for conversion to a naval auxiliary cruiser of the first class and her design will make her particularly valuable to Uncle Sam in the event of war.

At present the Matson line carries approximately 14,000 passengers a year between San Francisco and Honolulu. The Malolo, averaging 500 passengers a trip, but with a capacity of 650, and making two round trips a month will increase the total number of passengers a year from 14,000 to more than double this amount. This increase in the number of passengers will mean a great deal for San Francisco as the 12,000 or more passengers carried by this ship will all spend liberal sums of money for hotel bills and entertainment both prior to their departure and also after their return from the Islands. The company's present plans are to have the Malolo sail every fourteen days from San Francisco. The trip down will take four and one-half days from San Francisco. The ship will remain at Honolulu for two and one-half days and the trip back will take four and one-half days. There will be another stay of two and one-half days at the home port. No call will be made at Hilo. The Matson Line's two present largest ships, Maui and Matsonia, now serve Hilo every two weeks and will continue to do so. Passengers from the Malolo desiring to visit Kilauea Volcano and Hawaii National Park will be taken there by the Maui and Matsonia and also by a new Inter-Island steamer to be completed next year. The Inter-Island's present flagship, the Haleakala, now on the Hilo run, will be placed in service to Kaui, an island famous for its scenic beauty, but heretofore more or less little known to tourists owing to inadequate steamer facilities from Honolulu.

In line with this big development in tourist travel

The Malolo, opposite Diamond Head, Honolulu, as she will appear when finished

From a picture by Gordon Grant.

The uptakes for the Malolo assembled in the boiler shop at Cramp's shipyard, Philadelphia.

to Hawaii, the Matson organization has interested itself in assisting the Territorial Hotel Company, Ltd. of Honolulu in constructing the $3,500,000 Royal Hawaiian Hotel at Waikiki in a former royal coconut grove, adjoining the Moana Hotel. As Honolulu's hotel facilities are now crowded to the utmost from January to March, also during summer travel season from June until the end of August, the advent of the Malolo necessitated additional hotel facilities in Honolulu. The new Royal Hawaiian with its capacity of 400 rooms will accommodate passengers from the Malolo and will also be available for guests arriving aboard other ships from the Pacific Coast, Atlantic, and the Orient.

To provide entertainment for its guests, the new Royal Hawaiian Hotel will have a recreation center and an 18-hole golf course on the Waialae ranch, about three miles from Waikiki, the new course being necessary as Honolulu's present golf courses are crowded most of the year, particularly in the winter. The new hotel will be surrounded by a 20-acre tropical park of great beauty. The landscaping of the grounds is now being carried out under the direction of R. T. Stevens, a noted landscape architect of Santa Barbara.

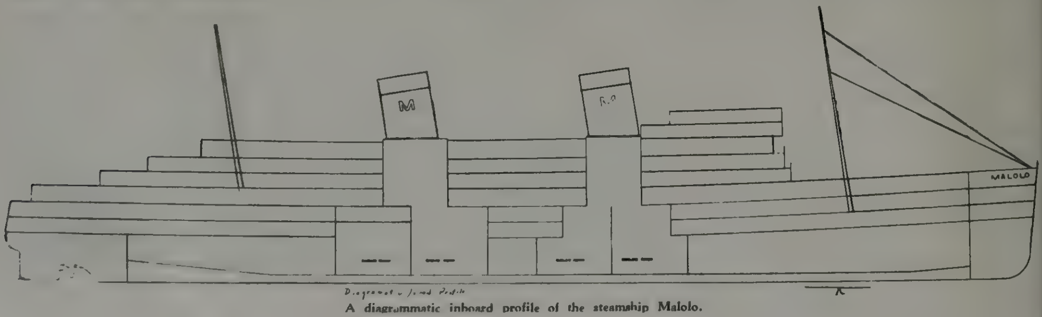
The Malolo will dock at the new territorial piers 8, 9, and 10 in Honolulu, these having been completed in the last year. The pier head will be surmounted by a great clock tower somewhat similiar to that rising above the Ferry Building at San Francisco. The tower will be known as the Aloha Tower and will welcome the big liner's passengers to the capital port of Hawaii and the mid-Pacific.

The Malolo takes her name from the flying fish which flit out of the sapphire Hawaiian waters like darts of lightning. Her passenger capacity will be 650, all first class. Of this number 480 will sleep in beds and 170 in Pullman berths. There will be 100 rooms with private bath and 50 private showers with toilets. The ship will be 582 feet in length and her great beam of 83 feet, greater in proportion than that of any existing Atlantic liner, will have her exceptional steadiness at sea. Her schedule speed will be 21 knots, but she will have a reserve maximum speed of 23 knots.

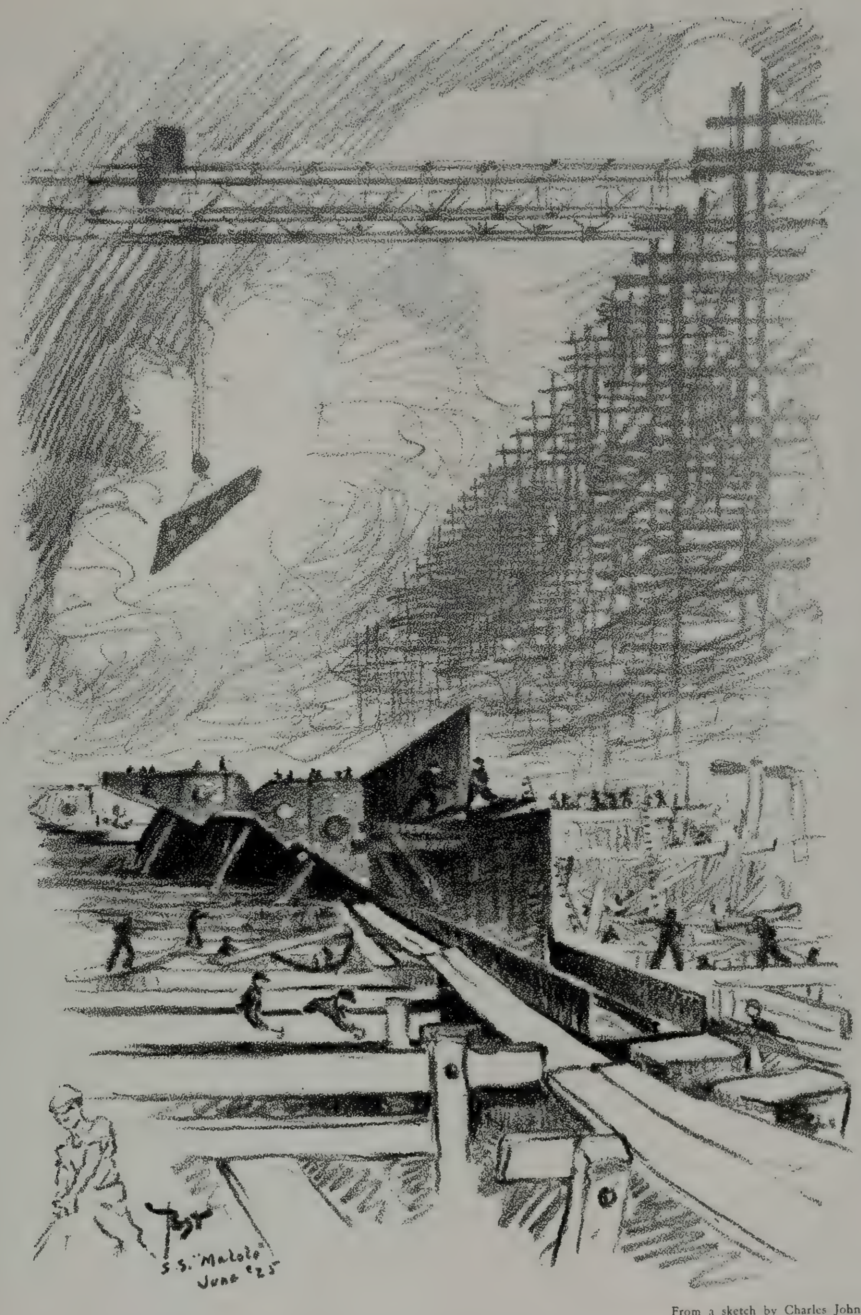
The Malolo's appointments include a dining saloon seating 500 passengers, or 600 if necessary, a gymnasium, swimming pool, beauty parlor, hot and cold salt and fresh water in every bath room, a telephone at each bed, enabling passengers to talk from their rooms with friends on shore when the ship docks at San Francisco and Honolulu, a radio telephone system enabling her passengers and commander to talk with other Matson ships at sea and with San Francisco and Honolulu shore stations, the most modern ventilating apparatus by which the air in each room is changed approximately every three minutes, a ball room, private dining room for special dinner parties, children's dining and play room, two motion picture theatres, elevators serving the five decks, soda fountain, more rooms with private bath or shower than any other ship in the world, electric baths, photographic dark-room, and many other features.

"Twenty-five years ago the Matson Navigation Company was incorporated and took over the business theretofore conducted by Captain William Matson and associates. Through the sagacity and foresight of its founder, the company has expanded to meet the demand for transportation caused by the development of Hawaii.

"It has always been the unwritten rule of the company to give to the extent of its ability, efficient and courteous service to all its patrons. I attribute a large share of our prosperity to the good-will of our patrons, which is our most prized possession."



A diagrammatic inboard profile of the steamship Malolo.



From a sketch by Charles Johnson Post.

Keel and Keelson at the Stern of the Steamship Malolo Looking Forward

MALOLO Her Design, Construction, Power Plant, and Equipment

EVERY human, so far as we have come in contact with the individuals of the genus homo, is more or less mildly interested in ships and in matters pertaining to the sea. From the standpoint of the steamship owner, however, it is necessary that many human individuals should become interested in particular ships, and there is, therefore, a great deal of thought and study put into the choosing of names for vessels of a steamship line and particularly for those which are to carry passengers. The name chosen for the finest, fastest, and most elaborately fitted out steamship ever built in an American shipyard is therefore a matter of some importance, and we congratulate the Matson Navigation Company on having chosen the name Malolo. The word itself, like many Hawaiian words, is intriguing both in its phonetics and in its orthography. But its meaning "Flying Fish," when applied to the fastest passenger liner on the Pacific Ocean, is nothing short of an inspiration.

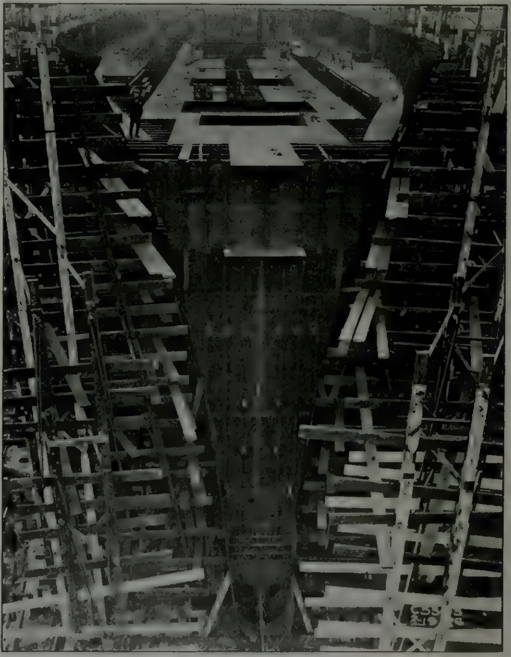
The Malolo is being built from the designs of William Francis Gibbs, president of Gibbs Brothers, Incorporated, naval architects of New York, at the Philadelphia shipyard of the William Cramp & Sons Ship and Engine Building Company. William Francis Gibbs has achieved a reputation as the foremost naval architect in America. For many years his organization supervised the design, maintenance, and reconditioning of the principal American-owned steamship fleets. A few years back this genius electrified the United States by making a complete set of working drawings of the great steamship Leviathan after the Germans had refused to surrender the original plans except upon extremely absurd conditions. Subsequent to this feat, William Francis Gibbs drew up the specifications for the work that was so successfully carried out in the reconditioning of the largest ship afloat. Specifications for the Malolo are acknowledged by naval architects to be a masterpiece of technical composition and nothing short of marvelous in the completeness and accuracy of their detail.

The specifications call for a vessel 582 feet in overall length, 83 feet molded beam, and with a displacement slightly in excess of 22,000 tons on a draft of 28 feet 6 inches. This hull is to house accommodations for 693 first-class passengers and a crew of 268 officers and men. First-class passengers only are to be carried, and the capacity in this respect is only exceeded by four other steamers. In addition to her human freight, the Malolo is designed to carry 7000 tons of fuel oil and will have a dry cargo capacity of over 200,000 cubic feet and a refrigerated cargo capacity of over 21,000 cubic feet. It is interesting to note that this cargo capacity is considerably greater than that of the Leviathan or the Majestic.

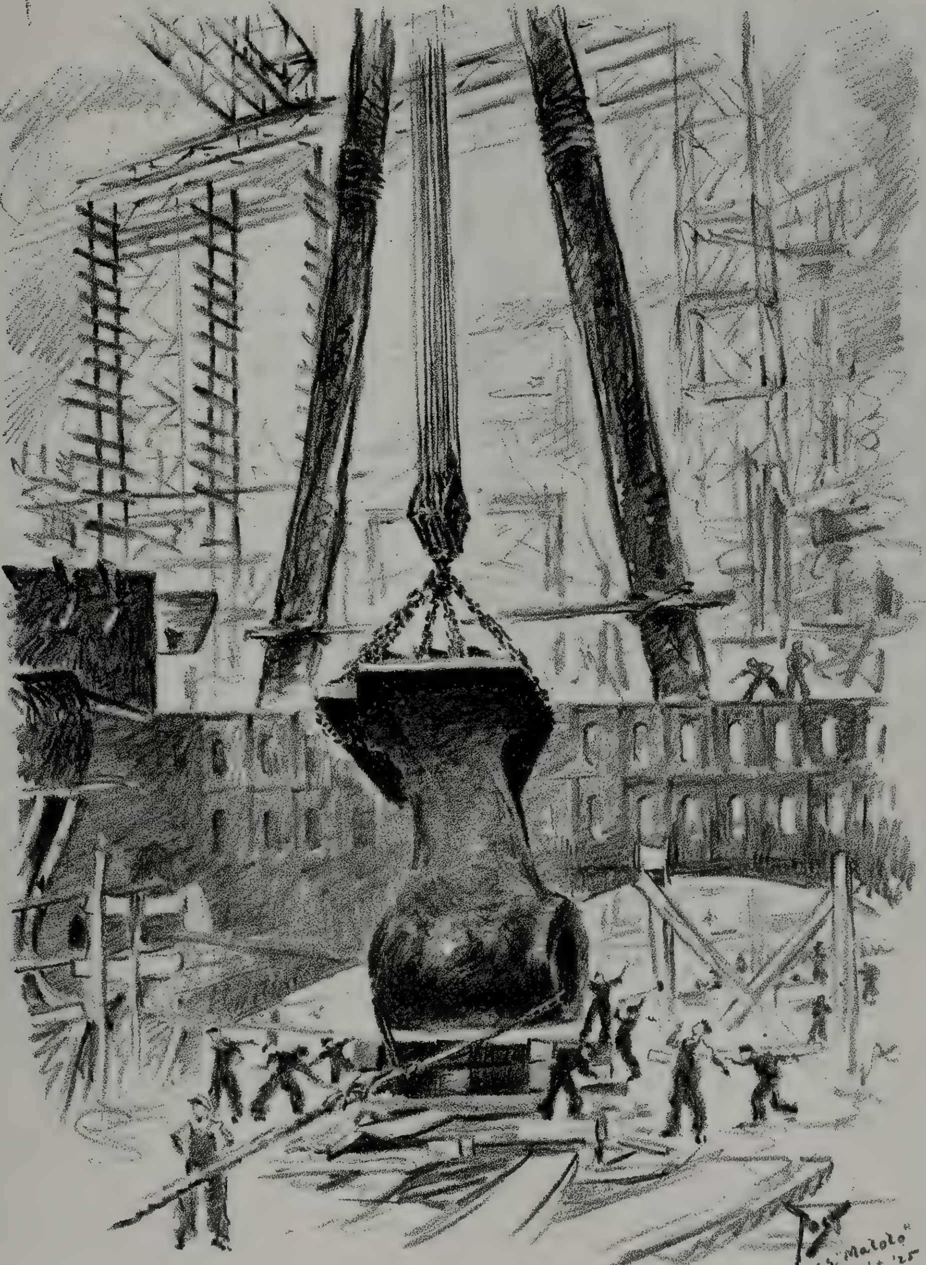
The passenger accommodations are arranged upon seven decks, lettered A to G inclusive. Ample watertight subdivisions are arranged to comply with all of the highest requirements of the classification societies and the United States Steamboat Inspection Service. For passage through water-tight bulkheads where necessary the openings are protected by water-tight doors, hydraulically operated. There are fifteen of these, seven of the vertical and nine of the horizontal type. They are controlled either locally or from the bridge by the Stone patent system of hydraulic control. This mechanism, together with piping, automatic indicator gear, and all necessary pumps, is supplied by the Stone Company of New York.

The Malolo will be driven by twin screws, with 12,500 shaft horsepower delivered to each screw. It is calculated that this power will give to the hull a maximum speed of 23 knots and a possible sustained cruising sea speed of 22 knots. Her schedule between San Francisco and Honolulu is to be four and one-half days at sea each way, which calls for a regular speed at sea of 21 knots.

The power plant on this vessel consists of 12 Babcock & Wilcox water-tube marine boilers with a total heating surface of 55,764 square feet and a superheating surface of 11,160 square feet. These boilers are built for a working pressure of 280 pounds per square inch at 100 degrees Fahrenheit superheat, which is said to be the highest working pressure ever installed on a passenger steamship. Each boiler is 29 sections in width and has six and a half groups of four 2-inch tubes over the furnace roof baffle, and one row of 4-inch tubes under the furnace roof baffle

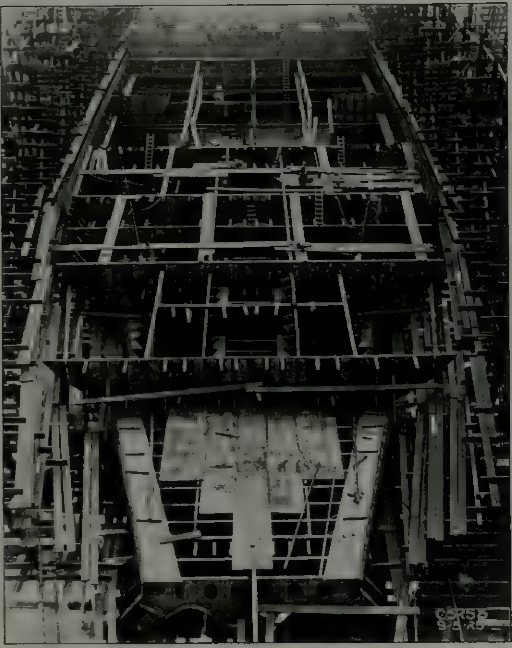


Progress picture taken late in February showing erection of beams for D deck aft of bulkhead 18, erection of bulkhead 18 between D and E, and plating of D deck.



From a sketch by Charles Johnson Post.

Steamship Malolo—Placing the Port Outboard Propeller Strut Weighing 41 1-2 Tons



Steamship Malolo early in March, 1926. View from the stern showing wing bulkheads in engine room, shell plating along line of F deck, erection of various bulkheads, and of C deck plating.

in each section. A feature of these boilers is the built-in Diamond soot blower installation, which enables complete and efficient cleaning of the heating and superheating tube surfaces. These boilers are arranged for the burning of oil fuel, each boiler having six Babcock & Wilcox mechanical atomization oil burners of the Cuyama design operating under forced draft. The furnace bottoms will be of sheet steel protected by two ¼-inch layers of asbestos millboard, 4 inches of calcined Sil-O-Cel, and two layers of split firebrick. Each burner is guaranteed to be capable of burning from 200 to 600 pounds of crude oil having a viscosity of 300 Saybolt seconds at 122 degrees Fahrenheit. The boilers are arranged in two boiler rooms, each of which has two batteries of three boilers each, these batteries facing one another with a common fire room.

This steam generating plant supplies steam at 280 pounds pressure to the Cramp-Parsons turbines, which are of the triple expansion type, each assembly consisting of one high pressure turbine, two intermediate pressure turbines, and one double flow low pressure turbine. This complete turbine assembly for each line shaft is arranged with two of the turbines in line on each side, these two turbines working on one shaft and driving one of the main shafts through two pinions engaging with two main gear wheels; so that there are two main gears, four pinions, and four turbines to each line shaft. The main gears weigh just forty tons each. The line shaft is 24 inches in diameter. The main gears have a pitch of 141 inches and a total working face of 57 inches. These gears are being machined and the gear teeth generated on the special tools maintained for these purposes by the De Laval Steam Turbine Company. At full speed and power the line shaft will be turning 1450 revolutions per minute, and the turbine shafts 120 revolutions per minute.

Progress of Work.

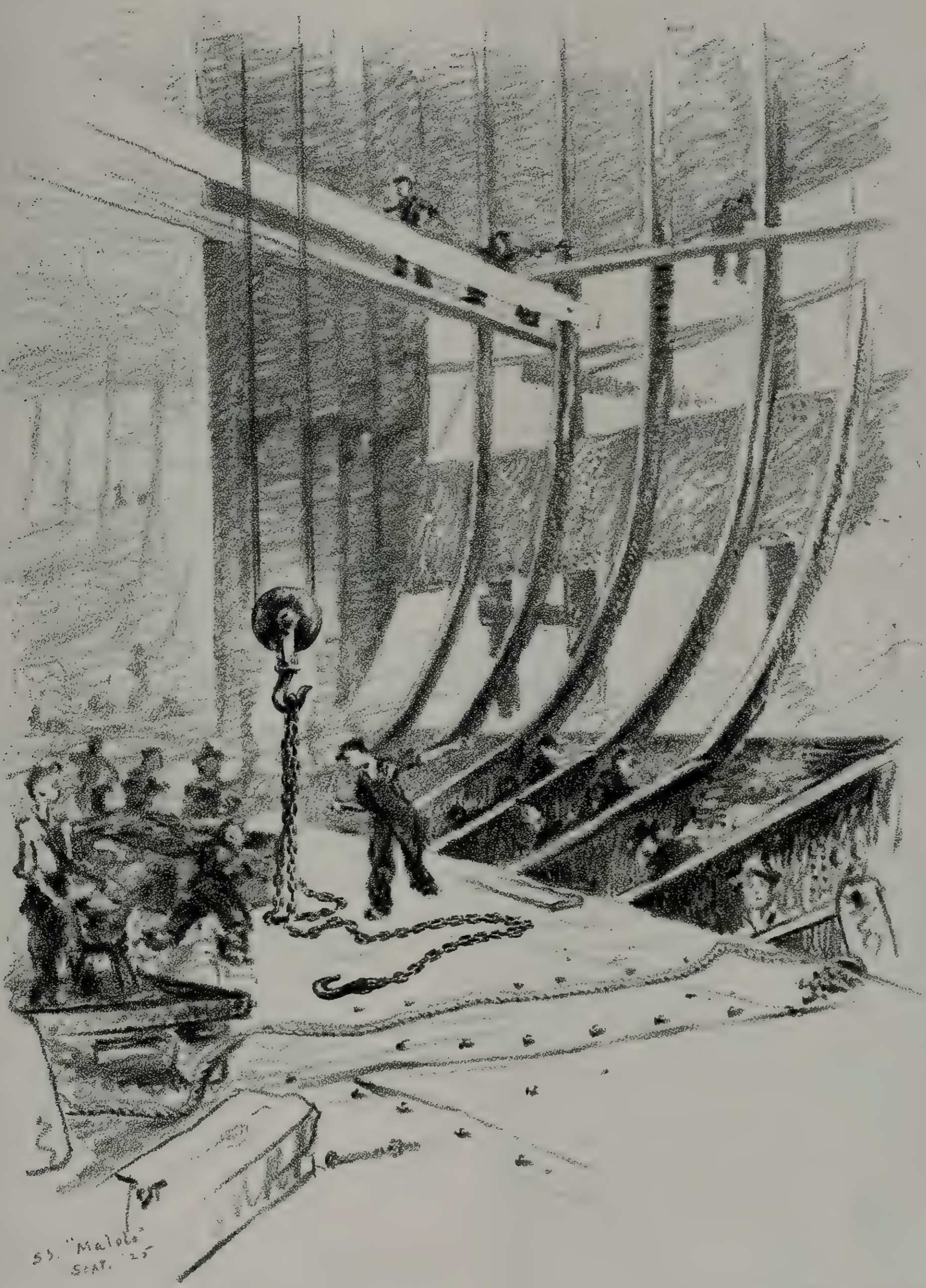
The keel of the Malolo was laid on May 4, 1925. To date over fifteen million pounds of steel have been erected in place in the steel fabric of the hull. This work has meant that over one million rivets have been driven. In this connection, it is interesting to note that these rivets were supplied by the Champion Rivet Company of Cleveland, Ohio, who are providing the entire rivet requirements for the Malolo. A feature of the contract under which this rivet supply is operated is that the rivets are being shipped in small quantities as the work progresses and according to the requirements of the builder. This feature, of course, requires prompt manufacture and shipment of each order to avoid delay in the work. Up to date the service has been 100 per cent, and this has been made possible by the fact that the Champion Rivet Company has a daily production capacity of 160 tons of rivets of a type that fully meet the requirements of both the American Bureau of Shipping and of Lloyds. The rivets already delivered on the Malolo order total 550 tons.

The hull is fast working into shape and, as shown by the progress pictures herewith, is roughly framed up to, and in parts above, D deck. The twelve boilers are all in place on their saddles and with their uptakes largely installed. The stern tubes and the great cast steel outboard propeller shaft bearing struts are in place. Incidentally these latter are said to be the largest steel castings ever poured for a steamship. The two weigh slightly over 83 tons, or in excess of 41 tons each. These castings, together with all of the steel castings for the hull, for the engines, and for all pipe fittings, were furnished in the rough by the Federal Steel Foundry, Chester, Penn., a subsidiary of the Wm. Cramp and Sons Ship & Engine Company. A special boring machine has been erected on the ways at the stern to bore out the seats for the propeller shaft bearings.

In the machine shop the turbines are being rapidly completed, more than half of the main units having had their final running test, and by April 1 it is expected the work of connecting up the main turbines and gears will be done and the complete assemblies will soon thereafter be ready for installation aboard ship. Although they are, of course, exceeded in power by many of the high speed geared installations in scout and battle cruisers, these turbines are said to be largest installations of geared turbines on a merchant vessel.

The line and propeller shafting has all been machined and finished, and the outboard shafting fitted with its bronze liners. Forgings for this shafting were supplied by the Bethlehem Steel Company, as were the forgings for the turbine rotors. The line shafting is 24 inches in diameter finished. There is 400 feet of this, weighing approximately 26 tons. It is all of open hearth steel to meet the highest requirements of Lloyds and the American Bureau of Shipping. There are 52 pieces of the turbine forgings with an aggregate weight of over 30 tons.

Miles of hard-drawn brass monel metal, and manganese copper turbine blading were supplied for the Malolo's turbines by the American Brass Company. Much of this blading is secured in the slots of the rotor by the use of silver solder supplied for this pur-



From a sketch by Charles Johnson Post.

Engine Room of the Steamship Malolo

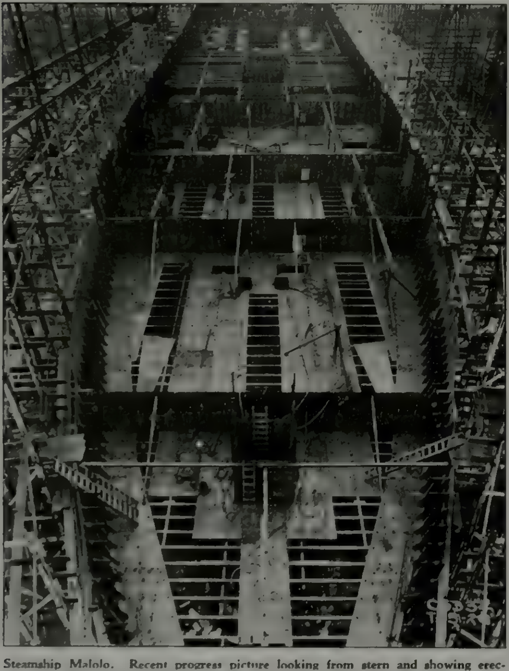
pose by the firm of Handy and Harman, who have specialized in precious metals for industrial purposes since 1867.

The majority of the equipment hereinafter described as pertaining to the finished vessel is already in the hands of the builders; so that it may be confidently asserted that the Malolo, which is scheduled for delivery about April 1, 1927, will be ready in ample time to take care of the summer rush in the San Francisco-Honolulu travel for that year.

Auxiliary Machinery.

A modern passenger liner is, so far as practical engineering goes, a modern city afloat. It becomes necessary, therefore for the marine engineer to incorporate into his plans and specifications machinery for taking care of all the needs and the desires of a population equal to the full capacity of the steamer in question. In the case of the Malolo, which is confined to first-class passenger accommodations, the marine engineer must cater to what is practically a luxurious club of 675 members traveling at express speed over the ocean.

For the purpose of meeting these requirements, the Westinghouse Electric and Manufacturing Company are providing for the Malolo a modern electric central station plant, a splendid switchboard equipment, a distributing system which carries the electric power and light to every part of this ship, and scores of motors of various capacities and characteristics to suit each individual application. All of the auxiliary machinery, with the exception of the steering gear, winches, windlass, and capstans, is electrically operated. This electrically operated machinery includes the motors and control for fire pumps; the motors and control for sanitary service pumps; the motors and control for the blowers for all hull ventilation; bracket fans for staterooms and public rooms; motors for service in turning over turbine shafts; motors and control for hot and cold water pumps; motors and control for exhausters and blowers of the forced draft system; and motors for refrigerator condensate circulating pumps.



Steamship Malolo. Recent progress picture looking from stern and showing erection of deck plating and bulkheads between frames 118 and 202.

The main generator units of this auxiliary power system will be Westinghouse turbo-generator sets of a special design which is said to be the latest word in balance and control. In addition to these turbo-generator units, there will be installed several small auxiliary diesel lighting sets to be used in emergency.

All of the deck machinery—winches, capstans, and windlass—is to be steam driven and will be supplied by the Hyde Windlass Company, Bath, Maine. A separate article in this issue describes this machinery. The steering gear is being supplied by the Bethlehem Shipbuilding Corporation, Ltd. and this is also described in a separate article.

The Griscom-Russell Company is supplying for the Malolo an installation of their well-known line of heaters and evaporators. This installation includes one No. 8 Reilly heater for the swimming pool, this heater having a capacity of 40,000 pounds of salt water per hour. For taking care of the regular hot water requirements there are to be installed one No. 14 Reilly fresh water heater of 30,000 pounds capacity and one No. 26 Reilly salt water heater of 60,000 pounds capacity. The evaporating plant has a capacity of 70 tons and consists of two No. 18 Reilly high pressure evaporators complete with automatic feeders and fittings, two No. 103 G-R straight tube distillers, and one 24-inch Reilly aerating filter. In connection with the boiler plant Griscom-Russell Company are furnishing two No. 48 Reilly navy type feed water heaters.

Piping for the various fresh and salt water systems and for the steam lines is one of the most important items with which the marine engineer and naval architect has to deal in design, construction, and installation. On the Malolo all valves in iron, brass, and steel, with the exception of gate valves, are being supplied from the well known "hidden quality" line of the Crane Company of Chicago. The gate valves are supplied by Chapman. An idea of the extent of the piping installation and of its capacity may be gained from the total capacity of the pumping equipment on board this vessel. This pumping equipment, largely supplied by the Worthington Pump and Machinery Corporation, is said to have a combined capacity equal to that of the water works for a city of one million nine hundred thousand people, giving each inhabitant twenty-five gallons a day.

Before leaving the machinery of this interesting vessel, we note that many of the daily newspapers have been working their statisticians overtime figuring what the fuel capacity of the Malolo would mean in terms of a "tin Lizzie." These gentlemen have figured that a Ford car could be run continuously for three hundred years on a single charging of the fuel tanks of the Malolo.

Passenger Accommodations.

The passenger accommodations of the Malolo, all strictly first-class, consist of 274 staterooms and the many and varied public rooms for the convenience and entertainment of passengers. For individuals or parties of exclusive and luxurious tastes and habits four suites de luxe are provided, each of which con-

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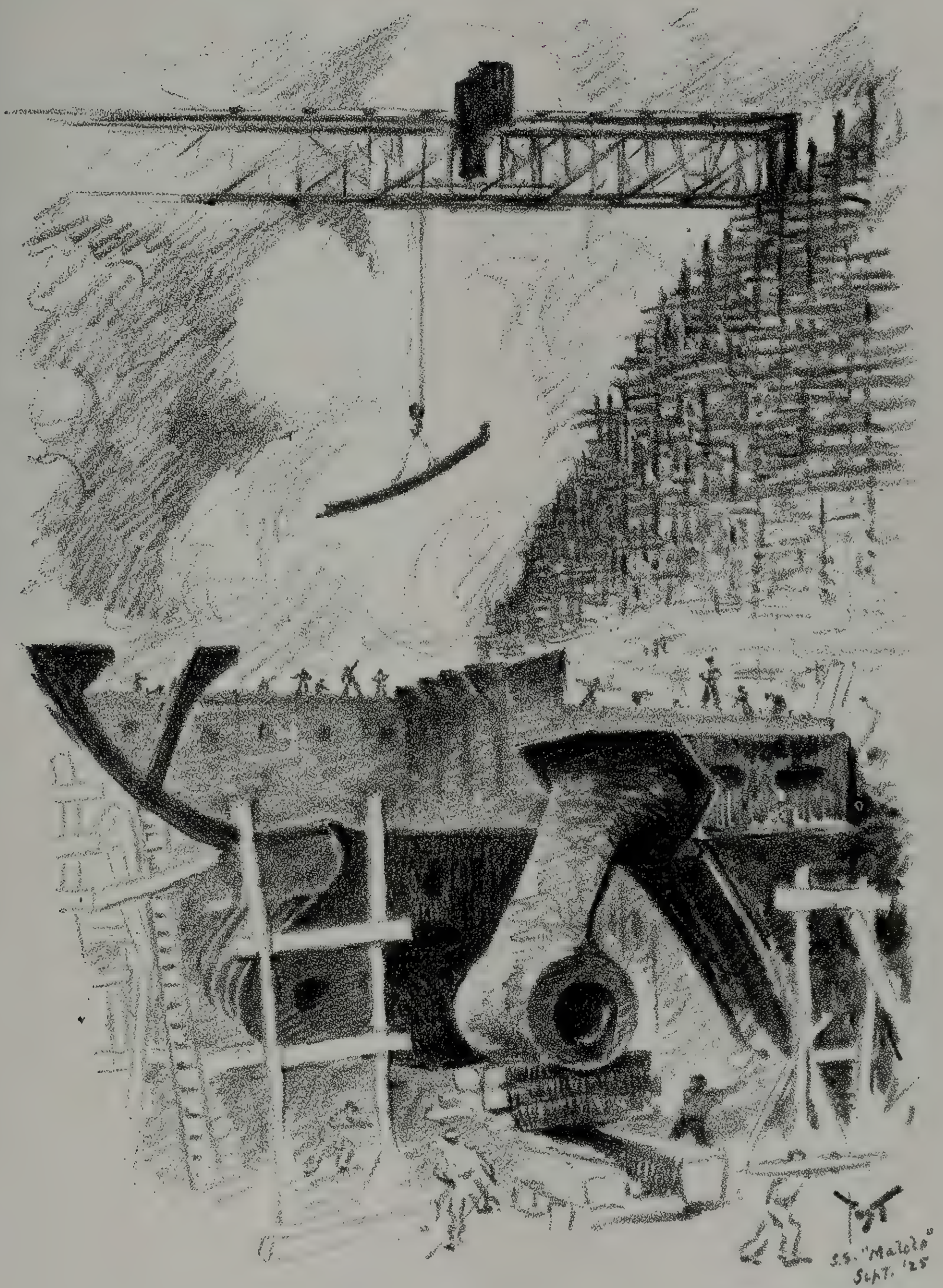


From a sketch by Charles Johnson Post.

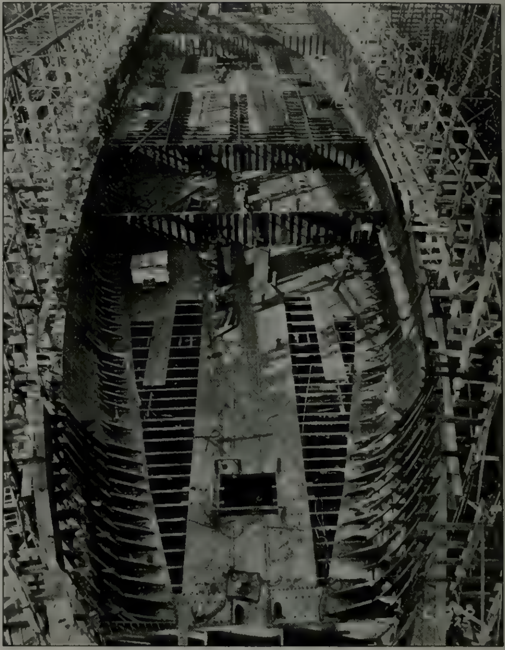
Stern View of the Steamship Malolo with the Massive 41 1-2 Ton Outboard Propeller Strut in Place and Showing the Fuel Tanks sists of four rooms with two private baths. Two of the suites have a private veranda each. One hundred of the staterooms will be fitted with private baths and fifty more with private showers. This feature of the Malolo places her in a class by herself among steamships, she having more private baths installed than any other vessel afloat. It goes without saying, of course, that every stateroom will be fitted with hot and cold running water and also with cool or warm ventilation. Four hundred and eighty beds are being fitted in the staterooms and 170 Pullman berths.

Wide open and enclosed deck spaces are available for promenades and for deck games. As will be noticed in the broadside view of the Malolo, shown herewith, the lifeboat equipment is stowed along deck B, thus leaving available deck A and deck C for unobstructed promenade, that on deck C forward being enclosed. Another notable feature is that these decks are of East Indian teak. Two hundred thousand board feet of this timber was supplied for the Malolo by S. B. Vrooman Company, Ltd., of Philadelphia.

The windows for the enclosure of promenade deck space are of the well known balanced Beclawat type and are supplied by the Kearfott Engineering Company of New York.

The Malolo is to have a magnificent dining saloon, capable of sitting 600 diners. This room will run the entire width of the ship, 83 feet, and will be 108 feet long in the clear, with two alcoves running forward on each side an additional 23 feet. These alcoves are arranged to be used as special dining rooms for private parties, for afternoon tea, or for any special limited functions. The furniture, table linen, and china, glass, and silverware in connection with these dining rooms represents the largest assembly of this material ever brought together for an American-built ship. Silverware totalling over 27,000 pieces is being supplied by the International Silver Company of Meriden, Conn. The Dorhmann Hotel Supply Company of San Francisco, together with Lenox, Incorporated, of Trenton, New Jersey, will furnish the china and glassware. This includes over 56,000 pieces of china and 42,000 pieces of glassware. Lenox, Incorporated, are providing a special tea and coffee service in Lenox cobalt blue glaze. This famous firm is also furnishing china electric light fixtures, some in plain white and others in solid gold, which are to be a feature of the decorative scheme in the public rooms and in many of the staterooms. The textile specifications for the Malolo are also the largest ever placed for an American-built steamship. Thirty-five thousand six hundred pieces of table linen are required for the service of the dining saloon. Linen sheets, slips, and towels total 57,000 pieces; cotton sheets, etc., 8478 pieces. The entire list is said to comprise nearly 100,000 separate pieces with sufficient surface to cover 32 acres.

The galleys and pantries to serve the dining saloon are very elaborately and completely equipped with hand utensils and with electric machines for taking care of food preparation and dish, silver, and glass washing. Included in the electrical equipment in this department are two silver and glass washing machines, two dish washing machines, one large toaster, two egg boilers, one potato peeler, one vegetable cutter, one cake mixer, one apple parer, one large bread mixer, one slicing machine, and one mincing machine. Pantries, which are in reality small well-equipped galleys, will be located on A, B, and C decks for the convenience of serving passengers in their staterooms.



Steamship Malolo. View from stern showing progress of construction on D, E, and F decks.

The main galley and pantries and the galley and mess room for officers and crew are located on D deck. Much of the electrical galley and pantry equipment is supplied by the Edison Electric Appliance Company, of Chicago. Another feature noticeable in the specifications is the profuse use of monel metal for various uses in outfitting and furnishing these galleys and pantries. This material was furnished by the Whitehead Metal Products Company, of Philadelphia.

A large and beautifully appointed ballroom, a special children's dining and play room, and two perfectly appointed motion picture theaters, together with a large and sumptuously furnished lounge, will insure the comfort and entertainment of the traveler.

One unique feature, so far as Pacific ocean steamers are concerned, is the very complete laundry equipment which is being installed to take care of not only the usual needs of the steward's department on a passenger vessel, but also to cater to all of the individual requirements of the passengers. A belated traveler, arriving in San Francisco from a long, dusty, transcontinental journey, just in time to catch his steamer for Honolulu will find ready for his orders as complete laundry and personal service machinery as he can find in any first-class hotel ashore. The laundry equipment is being furnished by the Troy Laundry Machinery Company.

A beautiful Pompeian swimming pool is being built into the Malolo on the G deck level. This is the first swimming pool of the built-in type to be placed in an American-built vessel. The pool will have a lobby and gallery for visitors at one end and the other opens into an electric bath which is fitted with complete equipment for shampoo, massage, and general therapeutic work. The roof over the swimming pool is supported by Grecian doric columns inlaid with colored mosiac in Pompeian motif. The frieze is carried out in Pompeian style, with mural paintings and decorative inlay. Bronze dolpin heads are used as outlets, a bronze lion's head head as inlet, and the pool itself is finished in beautiful tile. The Roman Mosaic and Tile Company of Philadelphia are installing this pool. In connection with the swimming pool is provided storage and laundry equipment for handling the three hundred one piece bathing suits and for rapidly drying the same. The plumbing for the pool and for the electric bathroom attached thereto is being supplied by A. B. Sands and Son Company, of New York, who also are supplying the bathtubs, toilets, fittings, and complete plumbing equipment for all bath rooms, showers, drinking fountains, pantries, and laundries.

Two bronze elevators serve the decks from A to F, one forward and one aft, the forward elevator shaft running down to G deck to serve the swimming pool.

Navigation and Safety Equipment.

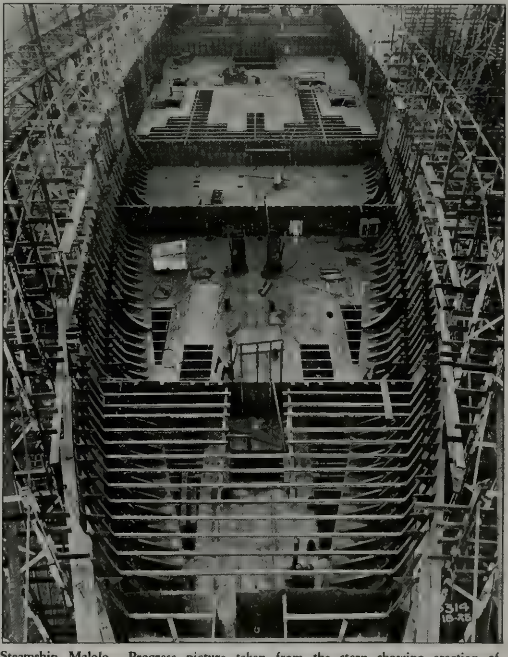
The interior communication system on board the Malolo will be very complete. In addition to the intercommunicating telephone system covering all staterooms and capable of being connected up while the ship is at dock to the shore system of the city so that passengers from their staterooms may communicate with friends ashore, there is to be installed a perfected system of telephoning to other Matson ships at sea through radio communication. A complete system of general alarm gongs, manual fire alarm stations, pilot house indicators, engine room indicators, and docking telegraphs is to be installed by Charles J. Henschel & Company, of Amesbury, Massachusetts. The general alarm gong system provides for the simultaneous ringing of a large number of gongs in various parts of the ship for emergency calls or for the separate ringing without disturbing passengers of all the gongs in the crew's quarters. The pilot house fire alarm indicator connects to fire alarm stations throughout the ship. These alarm stations consist of a small box with a glass front and an attached hammer. In case of emergency, the breaking of the glass at any station automatically registers by the flashing of a light on indicator boards both in the pilot house and in the engine room and rings a bell in each station. In case any circuit gets out of order a small green light indicates the station to which this circuit belongs and this light remains lighted until repairs have been made. Two sets of electrical engine room telegraphs, and two sets of indicators are provided on the bridge. Each set consists of a transmitter and a reply indicator for the starboard shaft and a transmitter and reply indicator for the port shaft. These sets are mounted on pedestals, one on the port side and one on the starboard side of the bridge. Mechanical reserve engine order telegraph system is also provided for in the case of derangement of the electric system.

A complete equipment of Sperry gyro-compasses will be installed as well as a Sperry automatic helmsman for automatic steering. This equipment will be of great value in a speedy passenger liner of the Malolo's type working on close schedule because it enables a true course to be maintained with minimum yaw, thus covering the distance traversed in the straightest possible line saving much time and fuel. The Sperry Gyroscope Company are supplying also an electric helm angle indicator, a shaft-speed indicator and comparator, and a Sperry high intensity search light of 18-inch diameter lens, and 30,000,000 beam candle power. Another interesting piece of navigation equipment is the electric sounding machine supplied by Weule of San Francisco, and described in a separate article in this issue.

An unusual piece of navigational equipment is the Bausch and Lomb range finder. This is a one meter instrument and is used for obtaining accurate distances from navigational marks where bow and stern bearings are impractical. This instrument is especially valuable in navigating harbor channels, as accurate and immediate readings of distance from bouys and other channel marks can be obtained by its use.

Another interesting detail of the navigational equipment of this vessel is the installation of the Cory-Kent clear view screens. Three of these are to be installed on the bridge of the Malolo, one window type screen centrally located on the enclosed portion of the bridge and two hood type screens on the wings of the bridge. This clear view screen consists of a polished glass disc rotated in its own plane on a central bearing by an electric motor at such a speed that rain, spray, or snow are instantly dispersed. With these screens complete transparency can be maintained in all weather conditions. The window type screen consists of a disc, its frame, a motor, and a motor bracket, all mounted in a polished teak frame, which take the place of an ordinary window in the wheel house or bridge shelter. The hood type is composed of the same details mounted in a hood which revolves on a metal pedestal.

For additional insurance of correct communication between engine room and bridge, there is a complete installation of Cory anti-noise telephones. This efficient speech transfer unit combines all of the advantages of the famous Magnavox anti-noise transmitter and the Cory marine anti-noise telephone system and



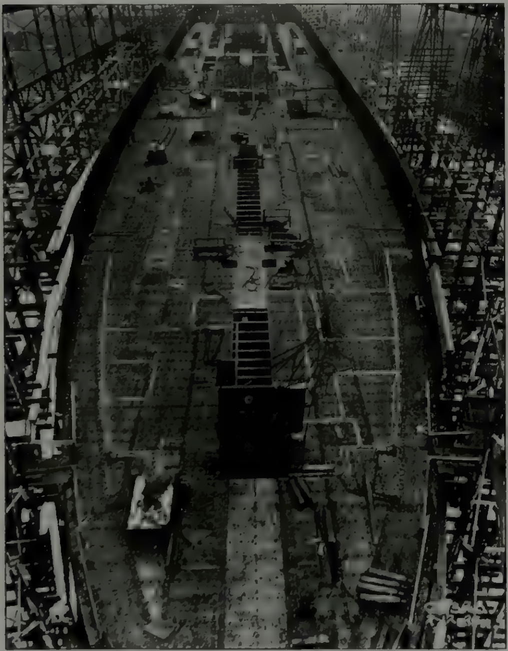
Steamship Malolo. Progress picture taken from the stern showing erection of additional frames above F deck.

provides a private exchange system between the bridge, the radio room, chart house, chief engineer's room, and the engine room as well as any other desired parts of a vessel.

In addition to the manual fire alarm system mentioned above, there will be installed a Cory-aero automatic fire alarm system which works on the expansion of air in small copper coils due to heat. These coils on the Malolo, in the shape of decorative rosettes, will be installed in all passenger quarters, lockers, pantries, crew quarters, and various other parts of the vessel. They will function through zone annunciators located in the vicinity of the main stairway. Simultaneously with indication on the zone annunciator there is relayed to the master annunciators located in the pilot house and in the engine room a similar visible indication of the fire location and an audible warning signal. This system of fire alarm is very delicate in its detection of unusual temperatures and instantaneous in its indication thereof at zone and master annunciator stations.

For the large open spaces, such as cargo holds, the Rich smoke detection system is being installed with indication cabinets on the bridge and in the chart house.

The lifeboat equipment of the Malolo is unusually complete. It consists of eighteen lifeboats, class 1-A, with a total capacity of 1020 persons. These boats are being built by the American Brown-Boveri Electric Corporation to the designs of the Steward Davit and Equipment Corporation. There are two motor lifeboats of steel 30 feet 6 inches long by 10 feet beam by 2 feet 6 inches draft. These boats have two watertight bulkheads, two masts, and are fitted with Mills releasing gear and equipped with complete radio equipment and ½-kilowatt electric set and electric lights. They are propelled by a 2-cylinder 6-inch by 8-inch heavy duty gasoline engine of the Standard Motor Construction Company's make, developing 16 to 18 horsepower. Twelve 28-foot round-bottom lifeboats and four 28-foot round-bottom nesting type lifeboats all of metal and fully equipped and fitted with Steward releasing gear, together with two 20-foot wood workboats fitted with Steward releasing gear, comprise the full equipment of boats. These boats are handled by 18 sets of the latest and most improved type of Steward davits with chock fittings of the Steward patent type, which permit launching the boat without raising it out of the chocks. This equipment was built and will be installed to comply with the test and inspection of the United States Steamboat Inspection Service, of the American Bureau of Shipping, and of Lloyd's Register of Shipping.


Steamship Malolo. Progress view from stern showing D deck and a portion of the engine room casing extending from D to A decks.

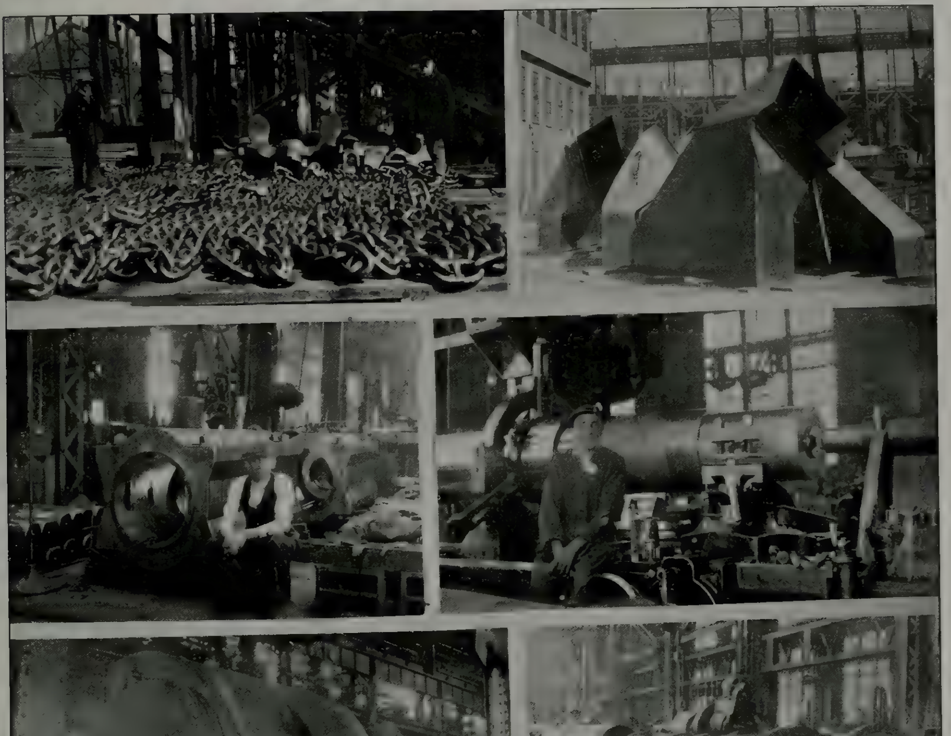
Lidgerwood electric boat hoists are being installed on the steamship Malolo. These hoists have two winch heads connected to the motor shaft by double spur gearing entirely enclosed. Diehl, Type T. D., completely water-tight split frame, reversible, compound wound 20-horsepower motors are used. At one end the shaft carries the pinion for driving the hoist, at the other end it carries the brake wheel of a Cutler-Hammer 10-inch water-tight magnetic shoe brake. The controller is the Cutler-Hammer reversible 20-horsepower drum with time limit overload circuit breaker. The hoisting duty on these boat hoists is 3000 pounds at 200 feet a minute.

It will be seen from above that the entire complement of passengers and crew are more than provided for by this lifeboat equipment. The motorboats are capable of towing at sea the rest of the lifeboats and the workboats at a speed approximately 5 knots an hour, and with their wireless in operation could readily reach anything within one thousand miles.

Eighteen hundred men are busily engaged at the shipyard of William Cramp and Sons Ship and Engine Building Company in the work of preparing, finishing, and assembling the various details that go to make up the finished job. Of these 1000 are working on the hull and 800 in the various shops. A well-nigh perfect marine engineering and constructional organization directs the activities of this small army. All of the most modern developments in materials handling machinery and in shop and yard tools and practice are available to insure a good job and expedite delivery.

This in brief summary covers a few of the highlights in the construction, design, and equipment of the Malolo, which will early in the summer of 1927 be welcomed to its home port of San Francisco as the outstanding example of all that is best in high class passenger liner construction and outfitting, which will undoubtedly open up a new vision of the attainments and the possibilities of Pacific Ocean shipping. Material, mechanical skill, and engineering ability from all over the United States and from many foreign countries will have combined in an international contribution to another triumph for American shipping and shipbuilding enterprise.

Parts and Equipment for the Steamship Malolo



Photographs taken by James S. Hines, publisher of Pacific Marine Review

Building the machinery for assembling equipment and outfit of a large passenger liner gives to the shipyard the appearance of a huge emporium. The pictures show a few of the many items now stored in the shops and warehouses connected with the yard of Wm. Cramp & Sons Ship and Engine Building Company of Philadelphia ready for installation on the steamship Malolo. At the top are the Baldt anchors and the Naco stud-link anchor chain cable of cast steel and a few parts of the uptakes. Next below, on the left, are the muff couplers for the line shaft and, on the right, one of the propeller shafts being finished in the lathe. The third line of pictures shows, on the left, one of the main condensers and, on the right, the stern tubes. The lower pair of illustrations show, on the right, a group of Chapman gate valves, and, on the left, the 41½-ton port outboard propeller strut being worked into position.

Equipment, Auxiliaries, and Fittings on MALOLO

Naco Anchor Chain Cable for the Malolo

THE MALOLO is the latest notable addition to the long list of vessels using cast steel anchor chain. Her equipment consists of 335 fathoms of Naco steel 3⅛-inch stud-link anchor chain cable weighing 555 pounds per fathom.

This chain has been tested under the supervision of the proper classification society to a proof load of 534,060 pounds and a breaking load or 747,680 pounds. These figures sound very large to the man accustomed to think in terms of specifications for ordinary types of anchor chain cable. They are explained by the fact that in drawing up specifications for Naco chain the proof load was set at the specified breaking load for commercial wrought iron cable. To this figure 40 per cent is added to arrive at a suitable breaking test for Naco. This excess strength thus really becomes a factor of safety of 40 per cent according to specifications and it actually amounts to practically 70 per cent when the ultimate strength of Naco chain is considered.

The Malolo's anchor chain cable, one of the largest built in recent months, was cast and furnished by the National Malleable & Steel Castings Company at its Sharon, Pennsylvania, works. This plant is especially equipped with electric steel making furnaces, electrically operated heat treating furnaces, and special testing machines for producing Naco steel anchor chain cable. The growing general use of this type of chain by vessels of the latest type and finest character is due largely to manufacturing developments at this plant which have made the production of a cast steel chain possible.

Manufacture of Naco Steel was carried on for some years previous to its use for anchor chain cable. Naco is an electric furnace steel of great toughness and high resistance to shock and sudden strain. It was developed first for car coupler knuckles, which are subject to almost continuous sudden shocks, strains, and blows. The similarity of this severe service to the conditions met by anchor chain cable indicated the fitness of Naco for this purpose.

The first problem which required attention in the manufacture of cast steel chain was the working out of a practical foundry method for producing chain links in sand molds and uniting them into continuous lengths of chain. A number of entirely successful equipments were prepared to accomplish this result. Connecting the links was accomplished by the precast link process, in which half the links are cast separately, shaken out, cleaned, inspected, and made ready, then placed in mold cavities and coupled up into continuous chain by pouring the connecting links.

An important step in the process of manufacture of Naco chain is that of annealing in special electric heat treating furnaces. In annealing this chain, the links of a shot are subjected to heat treatment similar to that given Naco car coupler knuckles. The shots are first drawn on a traveler into the heating furnace in which automatic control of temperature is assured by special contracting pyrometers. At the discharge end of this furnace, the chain is passed through a quenching tank, and then transferred to a drawing furnace and brought to the proper drawing temperature.

In use, Naco chain has developed several secondary advantages in addition to its great strength and shock-resisting qualities. It has been found that on account of the uniformity in size of links and shackles made possible by accurate machine molding, that the Naco chains handle more readily over the wildcats of the windlass, both in paying out and heaving in, and that the wildcat design may be reduced to a standard for the size required without allowing for chain tolerance as is required with wrought iron chain. The stud being cast integral with the link, not only increases the strength, but also eliminates the possibility of the chain kinking because of loose or lost studs.

Naco cast steel chain has been supplied commercially in large quantities and is in use on the seven seas and the Great Lakes.

Fire Protection for the Malolo

THE Foamite fire extinguishing system to be installed aboard the Malolo protects the forward and after boiler rooms and the port and starboard fuel oil filling stations.

The two tanks in which the Foamite solutions are to be stored (Solution A and Solution B) are located on F deck. Each tank has a capacity of 2300 gallons. The Solution A tank is lined with lead. The tanks are connected through a reducing valve, to the vessel's main air supply and, when charged, are continuously under a pressure of 15 pounds per square inch. The discharge lines between the solution tanks and the main control manifold are "wet" and are continuously under a similar pressure. In case of fire, it is only necessary to open the pair of manifold valves governing the flow of solutions to the ignited compartment.

In each boiler room the under floor area is protected by 32 Foamite marine distributors, so located that every pocket or compartment formed by the structural members that make up the tank top and support the boiler room floor, is covered by at least one of these devices. If a pool of oil on the tank top, within the confines of either boiler room, becomes ignited, proper control valves are opened and the two Foamite solutions are forced, under pressure, through a system of twin piping into these distributors where they impinge and react to form a tough, durable foam. This foam is discharged through the ports in the distributor chambers, extinguishing the fire expeditiously by blanketing the surface of the ignited oil and cutting off the oxygen supply.

Auxiliary hose protection is afforded for the boiler rooms in the form of three Foamite hydrants, one located in each boiler room and a third in the forward engine room adjoining the after boiler room. Should a fire occur on the boiler room floor, or in the piping at the boilers themselves, hose valves are opened and the Foamite solutions are forced through twin hose lines to a siamese nozzle set where they react and form a foam that is projected from the nozzle in a stream.

The port and starboard fuel oil filling stations are each protected by one distributor and one hydrant.

The main control manifold consists of six pairs of valves, governing the flow of solutions to the various Foamite outlets, located in the following protected areas:

(a) One pair of valves for distributors under forward boiler room floor;

(b) One pair of valves for distributors under after boiler room floor;

(c) One pair of valves for boiler room hydrants;

(d) One pair of valves for distributors in port fuel oil filling stations;

(e) One pair of valves for distributors in starboard fuel filling station;

(f) One pair of valves for fuel oil filling station hydrants.

All valves are of the indicating gate type and conspicuously labeled. The valves on the solution A lines are of acid resistive construction.

To insure the proper manipulation of valves in an emergency, a framed set of operating directions, including a diagram showing the piping layout and arrangement of outlets for the entire system, are mounted at the control manifold. These frame directions also contain instructions for maintenance of the system and data for charging the solution tanks.

To facilitate the labor involved in dissolving the chemicals and transferring the mixed solutions to the storage tanks, a steam piston pump and a sizeable dissolving tank are supplied with the Foamite equipment. To expedite the charging operations, this dissolving tank is fitted with steam and water connections and a perforated piping system for agitating the tank contents with compressed air. The solution A and solution B chemicals are mixed in a concentrated form, in batches, and later pumped to their respective storage tanks.

The protection afforded by the central system, using fixed distributors, is supplemented by batteries of portable Foamite extinguishers for use on incipient fires. Several dozens of these hand extinguishers are located at accessible points in the boiler rooms and near the fuel oil filling stations.

The Foamite system for the steamship Malolo was designed by the Foamite-Childs Corporation, fire protection engineers of Utica, N. Y. This type of marine protection has the approval of the United States Steamboat Inspection Service. The equipment is being installed at the shipyards of Wm. Cramp & Sons at Philadelphia, under their supervision. Gibbs Brothers, Inc. of New York are the marine architects.

* * *

The Malolo's Deck Machinery

THE Matson Navigation Company have always been noted for their efficiency and speed in handling cargoes, and in this regard the Malolo is to measure up fully to the standard set by the other vessels of the Matson fleet. While the amount of cargo carried is to be comparatively slight, the turn-around required at each end of the voyage means a very rapid handling of baggage and freight. The cargo winches for the Malolo, which are being supplied by the Hyde Windlass Company of Bath, Maine, are single-geared, single-drum, steam winches with double 8¼-inch by 10-inch cylinders. They are fitted with a reversing steam valve, and the control is by means of the throttle and this reversing valve. The drum is 20 inches in diameter by 18 inches long and is fitted with a cage to prevent the rope uncoiling on the deck.

The winches are designed for a working pressure of 150 pounds per square inch and for an approximate rope speed of 400 feet per minute on the drum. The spur gearing is machine cut and is adequately protected by guards. All shaft bearings are bronze lined. Copper piping is fitted between the control valve and the cylinder. The reciprocating parts are fitted with bronze boxes in the crosshead and on the crank pin. All stuffing boxes are packed with Federal metallic packing. All piston rods and valve stems are of monel metal. Many of these winches have been in satisfactory operation for the past five years on American vessels, notably on the fleets of Luckenbach Steamship Company, International Mercantile Marine Company, United States Shipping Board, and Matson Navigation Company.

Capstan.

Two steam capstans for warping purposes are to be fitted on the Malolo. These are of the well known Hyde self-contained type with engines located on deck and the gypsy head mounted on a sturdy frame over the crankshaft. The engine is a double cylinder 10 by 10-inch reversible type and the gypsy head is 24 inches diameter over the barrel. Each of the cargo winches has a 12 by 12-inch gypsy barrel mounted outside the bearing for auxiliary warping purposes, and the intermediate shaft of the windlass also carries two large gypsy barrels 20-inch diameter by 24 inches long.

Windlass.

The Malolo's windlass is of the steam spur-geared type with double gearing and with gypsies fitted on the intermediate shaft as indicated above. It is driven by double 14 by 14-inch steam engine with reversing valve, and the wildcats are designed for handling 3⅛-inch diameter stud linked chain cable. The chain to be handled by this windlass is described in another article in this issue.

All of the above machinery is being furnished by the Hyde Windlass Company of Bath, Maine, and is designed for a working pressure of 150 pounds per square inch and to be tested at full working boiler pressure of 280 pounds per square inch.

* * *

Worthington Pumping Equipment for the Malolo

IN consultation with the Worthington Pump and Machinery Corporation, the William Cramp & Sons Ship & Engine Building Company and Gibbs Brothers, Inc., have evolved an equipment of pumping machinery that is of the most advanced type to be found on any ship alfoat.

For each of the duties to be performed especial care was taken as to the design selected to insure the best efficiency and the greatest realibility in service. Where centrifugal pumps could be used, deriving their power from the central generating plant and thereby operating with a minimum expenditure of fuel, such pumps are driven by electric motors; where the service of centrifugal pumps is such that regulation is better effected through the use of steam and where the exhaust from the turbines can be used to advantage in heating feed water, steam turbines of Sturtevant make were selected. In many instances, however, it was found advisable to employ reciprocating pumps that would withstand the strains of the high working pressures used, as well as the temperatures encountered, and for which service the Worthington designs have demonstrated their fitness in vessels of all types all over the world.

The materials entering into the construction of all pumps were the subject of special study, as were the bearings and running gear generally, and while the engine and fire rooms of this vessel will be fitted with a considerable number of pumping auxiliaries, each has its specific duty to perform, either in servicing the propelling machinery or in supplying the needs of this large vessel in the way of sanitary flushing water, washing water, swimming pool service, fire protection, and other uses.

Large Worthington main air pumps of the twin beam reciprocating type are used with the main condensers, both for reliability and the varying conditions of service under which this vessel will be operated. With them are specially designed main condenser circulating pumps, steam turbine driven, of the most compact and up-to-date design. The auxiliary condensers are equipped similarly with their separate vacuum system.

The feed water system of the ship is taken care of by Worthington steam turbine driven main feed pumps, while for cruising speeds and for port use reciprocating pumps, long stroke, are supplied for the engine and fire rooms.

The fuel oil system will be supplied by long stroke Worthington vertical simplex service pumps. The transfer pump does the dual duty of pumping oil ashore through long lines should it be deemed desirable to dispose of any of the fuel which at times is carried as cargo and the transfer of oil to the daily supply tanks.

Ballast pumps, bilge pumps for both fire and engine rooms, washing water pumps, fire pumps, evaporator feed pumps, drinking water pumps, boiler testing pumps, and lubricating oil pumps are all of the Worthington simplex long stroke design.

In addition to the condenser circulating and main feed pumps of the centrifugal type referred to above are steam turbine or electric motor driven centrifugal pumps for the ice water recirculating system, the swimming pool recirculating system, the lubricating oil cooler, hot salt water, and hot fresh water systems.

For auxiliary lighting service or in case of emergency operating radio and lighting the ship a Worthington 2-cycle, solid-injection 25 kilowatt diesel engine Westinghouse generator set will be used.

Illustrations showing these units will in due time be available for publication. At this writing the equipment for a fire room has been finished, to carry out the test of the machinery for that part of the vessel. The remainder of the equipment is coming through the factories in orderly fashion and will be delivered per schedule laid down by the shipbuilders.

Malolo's Automatic Air Compressors

THE air compressing equipment for the steamship Malolo, will consist of two vertical compound steam operated compressors, manufactured by the Westinghouse Traction Brake Company of Pittsburgh.

These compressors are known as the 8½-inch 150 cross-compound type, each capable of supplying 150 cubic feet of free air per minute at 140 pounds discharge pressure when operated at 200 pounds steam pressure. This compressor has two steam and two air cylinders, the steam cylinders being at the top and the air cylinders below. The low pressure air cylinder is located below the high pressure steam cylinder and the high pressure air cylinder below the low pressure steam cylinder. The high pressure steam piston and low pressure air piston are on opposite ends of the same rod, while the low pressure steam piston and the high pressure air piston are on opposite ends of a second piston rod.

By means of a simple valve gear and reversing valve, the entry of steam is controlled to the high pressure cylinder to move the piston, after which it is expanded into the low pressure cylinder and thence to atmosphere. During this movement free air is drawn into the low pressure cylinder, compressed into the smaller or high pressure cylinder and then discharged to the storage reservoir.

The control of the compressor is entirely automatic. By means of a simple governor the pressure of the storage reservoir is set at a desired maximum at which point the governor operates to close the steam supply to the compressor, thus stopping compression. Now, when storage reservoir pressure is reduced a specified amount the steam supply is opened and compression resumed. It is, therefore, only necessary to set the governor to the desired range, after which no further attention is necessary.

Lubrication of the air cylinders is by automatic oil cups which regulate the oil supply to minimize carbonization. Very little attention is required by these lubricators, other than refilling at regular intervals.

The outstanding characteristics of this compressor are its efficiency and economy in steam consumption and reliable performance without the necessity of careful attention.

Fourteen Thousand Condenser Tubes

THE condenser tubes that are being used on the steamship Malolo are all made by the Chase Companies, Incorporated, Waterbury, Connecticut.

There are 14,354 condenser tubes, all of the Admiralty mixture, and an additional amount of tubing, some 2425 feet, has been ordered as ferrule stock. Over 100,000 pounds of condenser tubing in all will be supplied by the Chase Companies, and all of it is to be made of the Admiralty mixture.

The Admiralty brass alloy, which

is being used, is made of 70 per cent copper, 29 per cent zinc, and 1 per cent tin, and gives under normal conditions the best endurance and satisfaction. This alloy has been adopted by the British Admiralty and is now the standard in other foreign admiralties and in the United States Navy, the Shipping Board, and many public utility companies. It is used principally for salt or acid cooling waters and is made according to the most exact specifications that must pass very careful tests and inspections before they are accepted. The tubes must pass strict gauge, hammer, and pin tests, the latter checking the malleability and ductility of the tubes.

All of Chase Companies' tubes are made by the cast shell method in which the liquid metal is poured around a clay core. When the metal has cooled the core is taken out and the resulting tube is drawn down to the required size.

Chase condenser tubes have been used by such well known firms as Bethlehem Shipbuilding Corporation, Byllesby Engineering & Management Corporation, Great Western Smelting & Refining Company, The J. G. White Engineering Corporation, New Jersey Shipbuilding Corporation, Newport News Shipbuilding & Dry Dock Corporation, Pacific Gas & Electric Company, San Diego Consolidated Gas & Electric Company, Tide Water Oil Company, United American Lines, United Fruit Company, William Cramp & Sons Ship & Engine Building Company, United States Shipping Board Emergency Fleet Corporation, United States War Department, United States Navy.

Blocking the Kicks of 25,000 Horses

THE Malolo's propelling machinery is to be equipped with ten Kingsbury thrust bearings. This thrust works on the Malolo's Thrust Bearings—Hand s pivoted segment principle. The segments or shoes tilt slightly when the shaft rotates, forming a wedge-shaped film of oil which completely separates the bearing surfaces. This effective lubrication results in extraordinary durability and very low friction. About a thousand ships have been equipped with Kingsbury bearings in the last ten years.

Each of the eight turbine rotors will be fitted with a two-way Kingsbury bearing, by which the blade clearances are accurately maintained, in spite of the heavy axial steam thrust. These bearings are of special construction, consisting of three shoes mounted on spherical washers on each side of the collar, the whole being contained in a steel cage. This type is used on many high-powered ships in the United States Navy. The capacity of each turbine bearing would be sufficient to carry the propeller thrust on a powerful tugboat.

The two propeller thrust bearings are the largest yet constructed for merchant service and are exceeded in capacity only by the 45-inch bearings installed on the Navy airplane carriers Saratoga and Lexington, the highest-powered ships in the world. The single 42-inch collar is forged integral with the 21-inch thrust shafts, the bearings being installed abaft the turbine reduction gears. The shoes are mounted on equalizing rockers, so that each takes its due share of the load, in spite of springing and deflection of the seating and shaft when the ship is "working" in a heavy sea. The bearing area is very liberal, providing an ample factor of safety even under extreme conditions. It is interesting to note that four Kingsbury bearings of this size would be suitable for the propeller shafts of the Leviathan. These main thrust bearings for the Malolo, when operating at full power, will consume only one-eighteenth of one per cent of the total power developed.

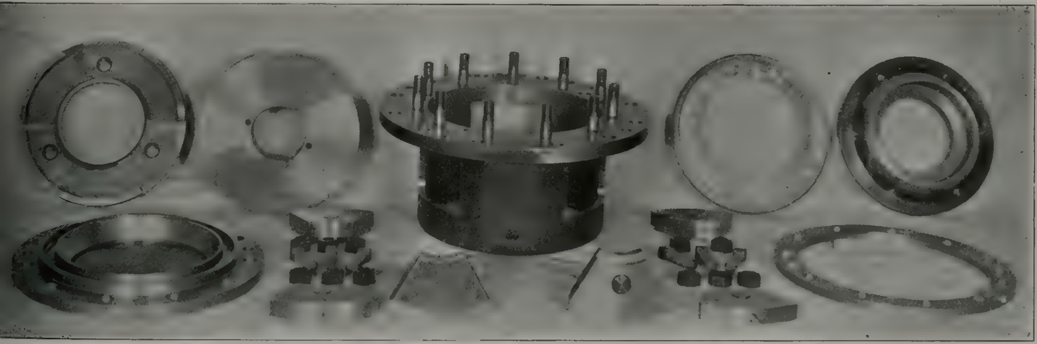
Plumbing Fixtures

THE sanitary fixtures on board the Malolo will be made especially for this job by the A. B. Sands & Son Company at New York City.

The design of these fixtures features quality, convenience, and maintenance. All of the metal parts, such as basin faucets, supply pipes, valves, and shower heads, are of polished white metal. The bath tubs are all of special design, flat bottom, with sanitary base, and secured to the deck. Adjacent to the tubs are grab rails, the tubs being equipped with white metal valves and china labels to insure hot or cold fresh water, and hot or cold salt water. Shower outfits are made of white metal, and the supply on the mixing valve is so arranged that the desired temperature of water can be secured without possibility of scalding.

All toilets, pressed type two-fired ware, syphon jet bowls, with a large waterway, are fitted with special white metal check hinges and a white metal oscillating Leviathan flush valve. The toilet

(Continued on Page 195)



The parts of a complete Kingsbury thrust bearing. Ten of this type will be installed on the Malolo.

Electric Soundings for the Malolo

EVER since man first began to navigate vessels over the sea one of the great dangers has been that of stranding in shoal water. With the shallow draft vessels of old Phoenician and Viking days this danger was easily avoided by feeling for the bottom with a long pole. As vessels grew in size and speed the lead and line were adopted, and after a long training individuals among seamen became very expert in rapid manual soundings by means of heaving the lead. With modern developments in steel and steam, however, it became necessary to have sounding machines. At first these were operated by hand requiring the services of three men and, in depths of 150 to 200 fathoms, some fifteen minutes to a sounding. It will be readily understood that this is altogether too slow for a fast modern vessel—a 20-knot ship, for instance—that easily travels five miles in fifteen minutes and so might meet disaster between soundings. So a demand was created for a more modern and efficient type of sounding machine.

Model A, heavy type, Louis Weule Company motor-driven sounding machine, two of which will be installed on the steamship Malolo.

This demand has been well met by the Louis Weule Company of San Francisco, who twelve years ago brought out a motor driven sounding machine of simple construction and control, which under the management of one man using one lever will easily take a sounding up to 300 fathoms every two minutes or less. This machine is in successful use on several vessels of the Matson Navigation Company and two will be placed on the steamship Malolo.

In this machine one lever frees the reel, engages the clutch, and applies the brake. The brake action is simple yet positive, and the wire may be stopped at any time by the simple application of the brake without shutting off the motor.

In the construction of this sounding machine the motor is entirely enclosed in a separate cast iron box with two end covers machined to a metal-to-metal fit and held in place by substantial cap screws spaced closely to insure a watertight joint. All gears and pinions are carefully machined and balanced. The wire reel is of cast brass and is regularly fitted with 300 fathoms of seven strand sounding wire.

The dial, set on top of the machine, is of white enamel and reads to 300 fathoms, and is protected by a brass cover when machine is not in use. The registering mechanism is a unit in itself and may be easily removed without disturbing the other parts of the machine. A dial lamp enclosed in a rigid watertight brass case is securely fastened to the top of the machine in the best position for illumination of the dial.

The bronze crank handle, shown on top of the machine in the illustration, controls all functions of the mechanism. At the central position of this handle the reel is free. A movement to the right engages the clutch, and the brake is applied by a movement to the left. The brake engages directly on the inner rim of the reel itself, bringing no strain on shafts, gear teeth, or motor.

Many tankers, freighters, and passenger vessels of Pacific Coast and intercoastal fleets are equipped with Weule motor driven sounding machines and have experienced great satisfaction in their use. The first of these machines was installed on the Standard Oil tanker El Segundo in 1914, and is still operating 100 per cent.

The Louis Weule Company are justly proud of the fact that this efficient device has been chosen to feel the way for and protect the navigation of America's finest passenger vessel.

The Malolo's Steering Gear

AN interesting steering gear installation is being fitted to the steamer Malolo, the new first-class passenger liner being built at William Cramp and Sons Ship & Engine Building Co. This gear consists of two 16 by 12 double cylinder, horizontal engines, driving a right and left-hand screw gear. One engine is fitted as a stand-by, and the gear is so arranged that either engine with control can be entirely disconnected in a simple manner, eliminating the possibility of both engines being engaged at one time. This is accomplished by means of clutches engaging the pinions to the crank shafts. All combinations of control for both engines are accomplished by the manipulation of one pin. Trick wheels with indicators are fitted at each engine for centering when connecting either engine.

In addition to the Bethlehem telemotor, the steering engine is controlled by the Sperry gyro-pilot automatic steering equipment, the power end of which operates the control valve through the after telemotor. The control unit of this equipment is mounted in the wheelhouse and this constitutes an electric telemotor system, in addition to the regular hydraulic telemotor.

An auxiliary hand gear is provided with suitable arrangement of clutches for driving the screw gear. Further auxiliary gear steering is accomplished by means of a wire rope drum operated by the hand wheels through worm gearing and suitable purchase to the rudder links. For this operation, the rudder links are disconnected at the screw gear sleeves. It will be seen from this arrangement that, with all the combinations of steering obtainable, the disabling of the ship from steering gear troubles is reduced to a minimum. This gear is the product of the Moore Plant of the Bethlehem Shipbuilding Corporation, Ltd.

Boosting Circulation on the Malolo

ONE of the most important factors in economic operation of steam turbines afloat or ashore is the maintenance of high vacuum in the condensers. High vacuum is always a physical possibilty through the use of superfine apparatus; but it is quite an engineering problem to maintain high vacuum at low cost.

For many years the C. H. Wheeler Manufacturing Company of Philadelphia have been specialists in vacuum and they have produced some very interesting mechanisms for assisting air pumps in producing and maintaining high degrees of less than atmospheric pressure. Of these, perhaps the best known is the Radojet augmenter which is to be installed as an assistant to the twin beam air pump on the Malolo.

In this augmenter the air and vapors are entrained by means of a continuous film of low pressure steam, which discharges radially through an annular nozzle and delivers the air and vapors through an annular diffuser into the condenser attached to the augmenter.

The steam for operating this augmenter is taken from the exhaust line at 2 to 5 pounds pressure; and the steam consumption is very low. Thus a considerable saving is affected on the fuel bill at practically no cost; since the augmenter improves the vacuum decidedly; and a higher vacuum always means a lower water rate. On a vessel using 25,000 horsepower continuously, a very small fraction taken of the water rate means a big saving in fuel expense.

Electric Light Fixtures of Lenox Chinaware

OF the many decorative features which will combine to make the public rooms of the Malolo among the most beautiful afloat will be electric lighting fixtures of the finest American chinaware. These are being designed and finished at the potteries of Lenox, Incorporated, of Trenton, New Jersey, a firm which for many years, in fact throughout their history, have specialized in the very highest class of china and, since the closing days of the last century, have been competing successfully with the oldest and most celebrated potteries of Europe.

The story of Walter Scott Lenox, the founder of this industry, is one of the most striking illustrations in American industrial life of courage, persistence, and fidelity to high ideals in the face of distressing set-back and almost overwhelming personal handicaps. After a practically single-handed fight to establish a pottery for the very highest quality china, a fight which was bringing practical success after seven years of struggle, he was suddenly stricken with complete blindness and paralysis of the legs. This was in 1895. The pottery which he had then succeeded in building up was under a staggering debt and the outlook seemed hopeless.

Walter Scott Lenox and his secretary, Harry A. Brown, now the president of the company, carried the business on together and after a few more years of bitter struggle paid off the last note and were at last able to present to America a product acknowledged by the best connoisseurs to be the equal of anything produced in the world and so to lay a fine broad foundation for the present potteries of Lenox, Incorporated, occupying more than seven acres of ground and fitted out with all of the latest developments in equipment for the making of fine china.

This plant is constructed very largely of glass and affords the highest degree of natural illumination, a factor of very vital importance to the many skilled craftsmen engaged in the delicate operations of clay molding, designing, coloring, glazing, and finishing.

Since 1889 Lenox, Incorporated, has been carrying on research work in the perfecting of its prouct. This institution, inspired by the spirit of its founder, has always placed quality ahead of quantity. The role of perfect quality has remained "inflexible and inviolate." The special Lenox processes of treating raw materials and of fusing them under correct temperatures impart to Lenox ware an exceptional durability.

Thus it will be that these chinaware electric lighting fixtures of the Malolo, although exquisitely dainty, being in some instances apparently as fragile as the petals of a rose, will still resist chipping and cracking to a notable degree, and will show remarkable durability under severe conditions.

It is said by those who have visited the plant that a tour of the Lenox properties is "a revelation in applied art." The painstaking care, the unvarying precision involved in every process impress themselves upon a visitor. The atmosphere partakes of the studio and the art gallery. The spirit of craftsmanship pervades the whole institution. When one has observed these things, sensed this spirit, one can better appreciate why the world has come to acknowledge Lenox china as the finest example of the present-day potter's art."

Electric Trucks Ready for Malolo

Matson Navigation Company Docks at San Francisco are Thoroughly Equipped for Rapid Loading and Discharging of General Freight

A REVIEW of the progress made in the past ten years should prove of interest to all steamship operators who are endeavoring to keep abreast with the times. No doubt one of the outstanding advancements is in relation to the receiving and handling freight at steamship terminals. Previous to 1915 comparatively little use had been made of mechanical handling apparatus by steamship companies on the west coast. A few large eastern railroads had started to experiment with the use of electric trucks prior to 1915. As a result of this development the use spread to many of the large basic industries. The apparent success of these small, but powerful efficient electric trucks resulted in a very wide and extended use being made during the war period.

In 1916 the Matson Navigation Company began investigating the possible advantages of electric dock trucks, and as a result of extensive tests made in the early part of 1916, Captain Saunders ordered the purchase of six Elwell-Parker electric lift trucks.

DELIVERING FREIGHT TO SHIPS SIDE

MATERIAL HANDLING DOWN IN HOLD

RECEIVING CARGO FROM SHIP TO WAREHOUSE

As frequently happens in endeavoring to introduce major changes, a great deal of resistance was offered, and it took several years to overcome this natural reluctance to adopt power trucks. The marked expansion which took place in the activities of the Matson Navigation Company and the gradually increasing difficulty in handling this tremendous volume of freight by the old method, tended to further the use of electric trucks.

From time to time additions were made to the original purchase, until at the present time forty-eight trucks are used in expediting the movement of freight and helping to keep down freight handling costs on the Matson docks at San Francisco.

S.S. Malolo as she will appear when finished.

Through courtesy of Gibbs Bros., New York.

Pacific Port Construction Program

Vaucouver, B.C. Coal bunkers to cost $250,000 will be built at North Vancouver shortly by the Vancouver Harbor Commission. It is estimated that $1,500,000 will be expended during the present year for developing port facilities, including the coal bunkers, a lumber assembly wharf, and a terminal railway on the North Shore. The Union Oil Company of Canada has announced plans for the construction of a wood dock 400 feet long by 200 feet wide at the site recently purchased on Burrard Inlet for erection of a refinery and storage plant. Mayor Morden of North Vancouver, has announced that arrangements have been made with the Grain Producers, Ltd., selling agency of Alberta and Saskatchewan wheat pools, to build a fully equipped modern elevator of 2,000,000 bushels' capacity at North Vancouver.

Victoria. Canadian National Railways have awarded contract to the Pacific Engineers, Ltd., Vancouver, for the erection of two ferry slips to cost about $60,000, one at Ogden Point and the other at Point Ellice. The harbor board has under consideration plans for a floating elevator.

Seattle Port Commission is planning the enlargement of Stacy-Lander Street Piers and the Whatcom Avenue warehouse. At the Bell Street Terminal the cold storage space will be increased.

Bellingham Port Commission has been offered the waterfrontage of the E. K. Wood Lumber Company for a sum of $375,000. The property has a frontage of 2200 feet and a depth of more than 400 feet.

Monterey city council has signed contract with A. W. Kitchen of San Francisco for building the new municipal wharf to be erected at the basic cost of $199,997. Francis Betts Smith, consulting engineer of San Francisco, will supervise the work.

Oakland. Lawrence Warehouse Co. has awarded contract to Industrial Construction Co., San Francisco, to build large warehouse on Oakland waterfront, to cost $296,000. Bryan Brothers, San Francisco, are architects. S. C. Lewis, president of the Julian Petroleum Corporation of Los Angeles, recently announced that contract has been concluded for the immediate construction of a refinery and terminal facilities on a 7-acre site acquired from the Parr Terminal Company. The petroleum company also has an option on a site for a similar terminal at San Francisco.

In dock at Nagasaki

Alameda city council has appointed a special committee of engineers to draw up plans for a port development project for the Alameda naval base site. The plans so far call for three slips 1500 feet in length and 275 to 375 feet wide and five piers, flanking each slip, with industrial areas. The present estimate of the project is $10,000,000.

Richmond. Duncanson-Harrelson Co. of San Francisco recently announced that they are preparing to build two wharves on Richmond inner harbor.

Los Angeles Harbor. Bids were opened by the Harbor Commission recently for reinforced concrete piles and sheet piles for Berth 228. California Construction Co., was awarded contract on a bid of $211,650. Catalina Terminal and Warehouse Corp. will build a warehouse and storage building on Broad Avenue and B Street. Dredging the port's main channel to a uniform depth of 35 feet and widening to 1000 feet will start after May 1. $1,000,000 will then be made available by the Federal government for the work.

San Francisco. Golden Gate Ferry Company, Hobart Building, has applied to the Board of State Harbor Commissioners for space at Pier 36 for operating an automobile and passenger ferry to Pacific Avenue, Alameda.

Modern Harbours, by Commander E. C. Shankland, R. N. R. 250 pages profusely illustrated and with numerous tables; published by James Brown & Son, Glasgow,

This book is devoted to the subjects Conservancy and Operations as they affect modern harbors. It is evidently compiled from notes gathered from personal experiences of the author who as Chief Harbor Master and River Superintendent at the Port of London, and in visits to all the great world ports, had come into intimate contact with port problems. The book is therefore a very valuable work.

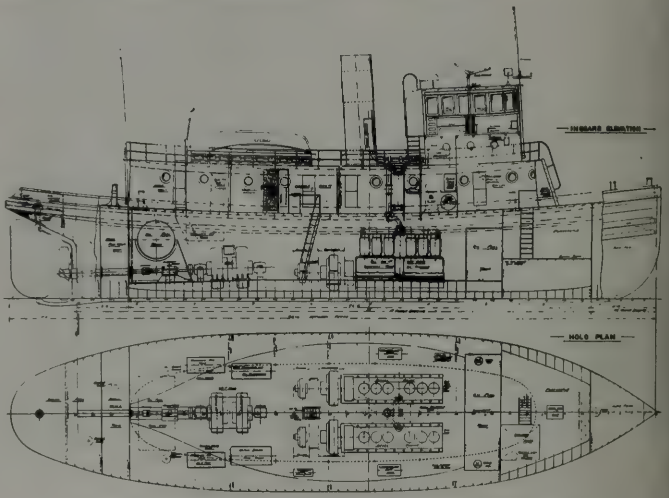
Grain Elevator and Terminal at Astoria, Oregon.

Marine Oil Engine and Motorship Progress

Two More Diesel-Electric Tugs

TWO diesel-electric tugboats for operation in New York harbor have been ordered by the New York Central Railroad Company and will probably be put in operation this summer. This company has a number of steam engine driven tugboats now in service and, following the recent successful operation of other diesel-electric tugboats, it was decided that the new boats should be electrically driven. Among the principal factors influencing this decision were economy, simplification, ease of control, and other advantages attendant upon the use of electricity.

The boats will be built by the Staten Island Shipbuilding Company at Staten Island, New York, and were designed by J. W. Millard & Brother, naval architects, New York. The complete electrical equipment will be supplied by the General Electric Company.



Inboard profile and hold plan of diesel electric tugs for New York Central R.R.

Each boat will be 108 feet long with a maximum width of 26 feet. The diesel engines and electric generators will be located amidships, while the propulsion motor will be installed aft and will be direct connected to the propeller shaft. The fuel oil storage tank will be located forward.

Power for driving the generators will be furnished by two diesel engines on each boat, one set built by the Ingersoll-Rand Company and the other by the McIntosh & Seymour Corporation. Each engine will be a 6-cylinder machine operating on a 4-stroke cycle, rated 400 brake horsepower. The Ingersoll-Rand engine will run at a speed of 265 revolutions per minute, and the McIntosh & Seymour engine at 300 revolutions per minute.

Each diesel engine will be direct connected to a General Electric direct current generator rated 270 kilowatts and 240 volts. The propelling motor for each boat will be a 650-horsepower, 115/145 revolutions per minute, 480-volt direct current motor of the shunt wound, double armature type. This motor, when connected in series with the two main generators, will be capable of delivering 650 shaft horsepower to the propeller shaft at any speed from 115 to 145 rovolutions per minute.

In addition to the main generators, each boat will be equipped with two auxiliary generators, each rated 30 kilowatts, for furnishing power for excitation, lighting, and for operating auxiliaries. These generators will be mounted on a shaft extension of the main generators.

One of the features of the boats will be a 75-horsepower fire pump on each, to be electrically driven, power being supplied by either of the main generators. Among the other electrically operated auxiliaries on each boat will be a bilge pump, circulating pump, fuel oil pump, sanitary pump, and air compressor.

Control of the boats will be from the pilot house and will be of the Ward-Leonard type. The control panels for propulsion and auxiliaries will be located in the engine room. A small instrument panel, however, will be located in the pilot house.

The Sandmaster

THE Sandmaster, a diesel-electric hopper dredge owned by the Construction Materials Company of Chicago, recently went into drydock at Cleveland preparatory to leaving that city for Chicago. The Sandmaster is a converted ship, the original name being Lake Weir, and the trip to Chicago will be her maiden voyage under the new power.

The Sandmaster will be the first diesel-electric dredge to operate on the Great Lakes. The work of converting the ship has been going on for some time, complete electrical equipment for propelling the boat and operating the pumps being furnished by the General Electric Company.

The propulsion equipment consists of two 600-brake horsepower diesel engines built by the Worthington Pump and Machinery Corporation, each direct connected to a 400-kilowatt main generator and a 50-kilowatt auxiliary generator. Under normal operation conditions each main generator will drive a 500-horsepower motor direct connected to a propeller, the craft being of the twin screw type. Wardeonard control will be used, proiding independent control of each ropelling motor and arranged for peration from either the pilot ouse or engine room. Provision vill also be made for operating oth propelling motors from one enerator.

One auxiliary generator will furish excitation for the motors and enerators and the other will be sed for furnishing power for drivng the engine room auxiliary moors, steering gear, and lighting. ll the auxiliaries will be electriclly driven.

In addition to the propulsion quipment, there are provided two 00 horsepower, motor-driven dreding pumps. The power for these will be taken from either or both of the main generators. Under one condition of operation, both dredging pumps will be driven from one generator, the other generator furnishing power for propulsion. Under another condition of operation, when no propulsion is required, each dredging pump will be connected to a main generator and will operate independently.

The boat measures 261 feet in length, with a beam of 43½ feet, and a loaded draft of 18 feet. Included among the electric auxiliaries, besides the steering gear, are two 10-horsepower pumps, six 5-horsepower pumps, one 50-horsepower pump, one 35-horsepower anchor windlass, two 20-horsepower mooring winches, one 20-horsepower after anchor windlass, two 20-horsepower suction hoists, two 125-horsepower jet pumps, and two 10-kilowatt motor generators for lighting.

Cylinder Lubrication on Pacific Diesels

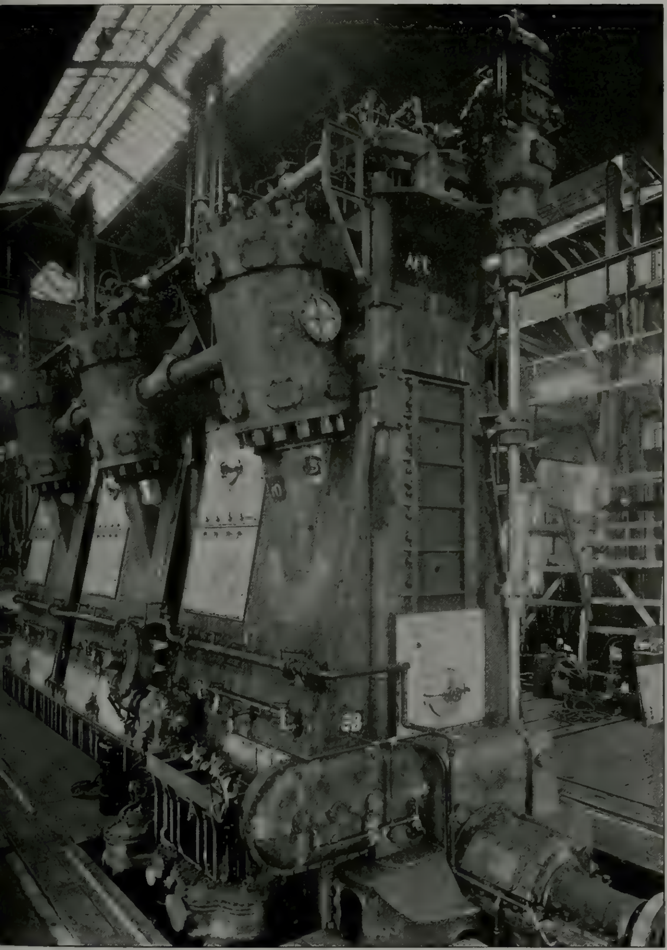
One of the most important factors in successful diesel engine operation is effective properly timed cylinder lubrication. On the Pacific Werkspoor diesels for the Shipping Board now being completed at the Oakland, California plant of the Pacific Diesel Engine Company, Bowser, R. P. type model "M" lubricators are used, and the following descriptive specifications give a good idea of the installation and operation of these efficient mechanisms.

Main Engines.

These engines are of 8-cylinder single-acting type of 2900 horsepower each at 95 revolutions per minute. The cylinder bore is approximately 31½ inches with a stroke of about 51 inches. There are eight 4-feed Bowser Model "M" force feed lubricators on each engine, one for each cylinder.

Each lubricator is operated separately by an eccentric, which is driven from the cam shaft of the engine. The eccentric and lubricator are so arranged or set that the injection of lubricating oil on the piston rings and cylinder walls takes place at the extreme bottom stroke of the piston. The four oil inlets to the cylinder are evenly spaced around its circumference, and the inlets connected to each other by oil grooves, thus assuring perfect distribution of oil on the piston rings and cylinder wall. Each lubricator is also equipped with an electric heating element and inlet float control valve, the inlet of which is connected to a main lubricating oil supply line, which receives its supply from a gravity overhead storage tank, or some other convenient arrangement.

The purpose of the float control valve is to keep the lubricator reservoir full of oil, shutting off the supply when the lubricator is full and opening as it empties. This does away with filling the reservoir by hand and prevents overflowing



Bethlehem 2-cycle marine type reversing Diesel engine for the General Petroleum Corporation tanker Lio. 3000 horsepower in six cylinders. The engine is here shown set up in the erecting shop of the Union plant, San Francisco of the reservoir and splashing of oil.

In having individual lubricators for each cylinder, there is the advantage of a shorter discharge line, cutting friction down to a minimum and improving the regularity of the timing of the oil discharge.

Auxiliary Engines.

The auxiliary engines are of the single-acting type, 4 cylinders, 400 horsepower at 225 revolutions per minute. The cylinder bore is approximately 16½ inches and the stroke about 23-⅜ inches.

Each engine is equipped with a ten-feed Bowser Model "M" RP type force feed lubricator. This lubricator is of the double lever drive with a divided shaft and a divided tank for two kinds of oil. Each cylinder has two feeds leading to it, making a total of eight feeds for the engine cylinders and two feeds for lubricating the air compressor. These two feeds are equipped with a special fine drip nozzle, which enables the operator to cut the lubricating oil supply to the compressor as fine as he desires.

The lubricator is driven by two eccentrics, operating from the cam shaft. The lubricator gear shaft is divided between feeds 4 and 5. Each eccentric and lever arm on the lubricator drive shaft are so arranged that they will be in the same plane, and synchronizing with, as their respective pistons in the engines, that is to say, when pistons one and four which are in the same plane are down, their respective plungers in the lubricator are also down. When up the plungers in the lubricator are up, thus the oil is injected on to the piston rings at the extreme bottom center of every other stroke, since the lubricator driving mechanism is operated from the cam shaft which runs at half engine speed.

* * *

Handling of Oxygen Cylinders

AT FIRST, most welders and storekeepers have the proper respect for an oxygen cylinder, for they realize that within the seamless steel shell is confined a great amount of pressure. But day in and day out these cylinders are safely handled, and before very long they are usually considered in about the same class as a hammer or wrench—that is, as a tool.

Correct handling of oxygen cylinders is not a difficult matter. It is only necessary for the welder or storekeeper to remember and apply a few precautions. These can be stated very simply.

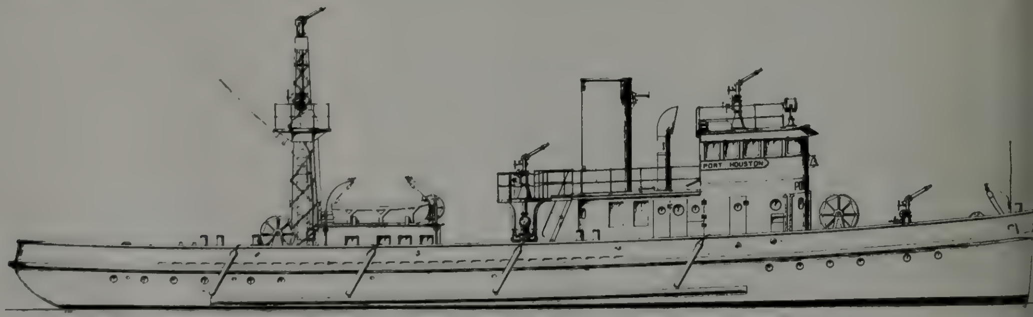
Cylinders kept in stock should be kept out of the passage ways so they will not be knocked over. Never store them near oil or grease. Preferably, they should be stored in a convenient space by themselves and separated from combustible material.

An oxygen cylinder should not be used to hold the door open, or as a coat rack, or as a substitute for the missing leg of the old coalstove in the corner. It is also bad practice to stand them near a forge or preheating furnace. Pressure increases when the cylinder is heated. Oxygen cylinders are all equipped with a safety device which acts as an excess pressure release. So if the temperature is raised, the pressure also increases, the safety device acts, and the oxygen escapes into the air.

One often hears a welder say, "Bill, bring me over a tank of air." What he means is that he wants a cylinder of oxygen. The words "air" and "oxygen" should not be used to mean the same thing, for they are by no means the same. Air contains some oxygen, but also four times as much nitrogen. Nitrogen is very inactive, oxygen very active.

So it is safe to do many things with air, which it would be very hazardous to do with pure oxygen. For instance, compressed air may be used for blowing out pipe lines, operating pneumatic tools, starting diesel engines, to place head pressure in a tank, and dusting clothing. Never use oxygen for these things or as a substitute for compressed air.

For years oxygen and equipment suppliers have preached the slogan "Oxygen—Use No Oil." They mean what they say. Oil and oxygen should never be brought in contact with each other. They will flare out a quick protest in no uncertain terms. Oxygen, although it will not burn, will aid in rapid combustion, and will cause oil or grease to ignite and blaze furiously. Therefore do not handle oxygen cylinders with oily or greasy hands or gloves. Sometimes a valve may stick a little and because the welder's hands are slippery with oil he will pick up a piece of oily waste and try to turn the wheel. This is a very careless practice for it gives an excellent opportunity for the oxygen to come in contact with the oil and a fire to start. Everyone handling oxygen cylinders should write this slogan indelibly in his mind, "Oxygen—Use No Oil."



Outboard profile of new diesel-electric fireboat for the City of Houston, Texas. Designed by Cox and Stevens, of New York, building at the Harlan plant of the Bethlehem Shipbuilding Corporation, Ltd.; two 400-horsepower Winton diesels, Westinghouse generators and motors.

Boatyard Notes

Three workboats on the Marine Ways, Los Angeles Shipbuilding and Drydock Corporation.

At Antioch, California, where the fresh waters of the Sacramento River are still free from the salt of the Pacific Ocean, is an ideal location for shipyards mainly engaged in building barges, workboats, fishing craft, and other small vessels of which there are so many plying among the islands of the Delta of the Sacramento and San Joaquin rivers. Some years ago small shipbuilding was quite an industry there. At Benicia, nearby, one of the most famous yards on the Pacific Coast was located. However, conditions changed, and the shipbuilding industry became only a memory until lately. Young men with new ideas and fresh ambitions have taken hold, and Antioch and Pittsburg will from now on be lusty competitors for business in the smaller wooden craft construction.

The head of one of the establishments is F. L. Fulton, formerly of San Pedro. His yard is in full operation, and he has several orders in hand. On the ways are a tug for Jim Wilder and a heavy self-propelled barge for the Larkin Transportation Company, of San Francisco. The tug, 53 by 18 feet, is very strongly built and of good design. She will be engined by a Western-Enterprise 135-horsepower diesel. The power barge is 65 by 24 by 7 feet, with a heavy deck extending two feet on either side. This is strongly braced and kneed with filling strips to prevent catching at piers. Her engine will be a 75-horsepower Atlas-Imperial diesel. Owing to the design of the hulls of these barges, they are easily handled with single screw. They can carry big loads on a light draft, and are especially useful on the upper San Francisco Bay and river waters.

Mr. Fulton has recently overhauled and rebuilt the workboat Escort, for the American Bridge Company. She has been fitted with a new Atlas-Imperial diesel of 160 horsepower. The Billy R., another workboat, owned by the D. W. Hume Co. of Benicia and used in their Delta trade, has just been reconditioned at the yard. A new workboat for the Rio Vista Transportation Co., which is soon to be built by Mr. Fulton, will have a 125-horsepower Western-Enterprise diesel engine. At the yard is a well-equipped woodworking shop, with blacksmith shop, derricks, and ways to handle around 500 tons.

V. D. Fry, who for many years was associated with the Atlas-Imperial Engine Company at Oak-

The workboat basin and outfitting wharf of the Los Angeles Shipbuilding and Drydock Corporation land, has started a shop for the repair and installation of marine engines in conjunction with the Fulton Yard at Antioch, California. A small but highly efficient shop will enable Mr. Fry to do good work, which will in all cases be given his personal attention. During his connections with the Atlas-Imperial Engine Company, Mr. Fry was for some time in charge of installation work, and is very proficient in this line.

Another new firm has recently commenced operations at Pittsburg as wooden hull builders. It is the Bundesen & Lauritzen Company, of which J. R. Bundesen and H. F. Lauritzen are the members. Besides a finely arranged and equipped yard, this new company will have an up to date machine shop, where all kinds of repairs and installations can be carried out. New work will also be attended to if desired. At this writing active operations had hardly commenced at the yard, though one craft was being put in shape to carry the United States mails to Delta points. She will have a Corliss gas engine of 75 horsepower, and, from her lines, will be speedy. The Bundesen & Lauritzen shops will devote much of their activities in machine work to installations of Atlas-Imperial engines, having made arrangements to handle the products of that company.

With the Engine Builders

ANNOUNCEMENT has just been made of the construction of the following new boats for service in the San Francisco Bay district, and the placing of orders for the engines for same:

A new tug for the Jim Wilder Towing & Freighting Company of San Francisco, now being built at Antioch, California, to be powered with a 135-horsepower Western-Enterprise diesel marine engine, 4-cylinder unit.

Peterson Barge No. 4, now building for the Harbor Tug & Barge Company, which will be powered with an 80-horsepower Western-Enterprise diesel marine engine, 3-cylinder unit.

A boat under construction for unnamed owners at the Nunes Bros. boat builders, at Sausalito, which will be equipped with a 110-horsepower Western-Enterprise diesel marine engine, 4-cylinder unit.

The selection of a Western-Enterprise engine for the first named of these new boats is a distinct tribute to this engine and to the manufacturer, inasmuch as it is a repeat order placed by an owner who has used these engines over a long period of time, and he speaks a high degree of confidence and satisfaction derived from their use. The tugs Jim Wilder No. 2 and the Margaret A. Wilder, both owned and operated by the Jim Wilder Company, and in service now for a considerable period of time, are powered with Western-Enterprise diesel engines, the former having a 125-horsepower 4-cylinder engine, and the latter a 135-horsepower unit. It is worthy of notice, too, that the order for the second Western-Enterprise engine for the Margaret A. Wilder, resulted from the satisfactory service record of the Jim Wilder No. 2, which was the first of these three boats powered with a Western-Enterprise engine.

Western-Enterprise Diesel Engines is the title of Catalog No. 501 recently issued by the Western Machinery Company of Los Angeles and San Francisco. This catalog covers in a most complete and comprehensive manner the marine and stationary types of diesel engines manufactured by this concern. The book contains 46 pages and is profusely illustrated.

After a brief introductory history of the Western Engineering Company and a general description of the principal characteristics of the engine, the book puts forth in great detail photographs and descriptions of the various sizes and types of engines giving full specifications and charts showing detail of working parts and general dimension diagrams of marine engines. The book also contains a number of pages of excellent photographic reproductions of marine craft powered with Western-Enterprise diesel engines, together with their principal dimensions.

We believe that anyone at all interested in the diesel engine will find it worth their while to apply to the Western Machinery Company at Los Angeles or San Francisco for a copy of this excellent book.

Washington - Estep Diesel Engines is Bulletin B of the Washington Iron Works, Seattle, Washington, manufacturers and distributors of this excellent power plant for marine and stationary work.

The large number of fishing and small freight craft powered with the Washington-Estep diesel engine (which are illustrated in the catalog) give evidence of its successful operation in Puget Sound and Alaskan waters. The Washington Iron Works have recently appointed the W. H. Worden Co., Inc., San Francisco, their California representatives.

Asbestos Insulation

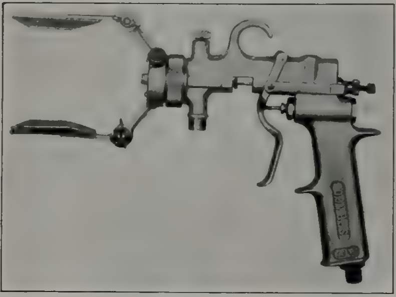
THE Jones Bros. Asbestos Supply Co., Inc. of San Francisco, while not an old firm, is making strong headway in its field. Two brothers, F. E. and E. F. Jones, starting about five years ago, have built up a good connection in the insulating and roofing business. Besides buildings and steam plants, the company installs considerable marine insulation. A four story building at 500 Second Street, San Francisco, is occupied as a warehouse and factory. All types of packing and insulating material are handled. They are also distributors for the Phillip Carey Co. of Cincinnati, one of the oldest and best known firms manufacturing asbestos and magnesia products.

In the San Francisco factory some thirty employees are constantly at work, and besides these at times a hundred men are working on outside jobs. Special machines are used in this plant which will form almost any style of block for insulating. Cold storage work is a special feature of the firm's activity, several quite extensive jobs having recently been turned out. A stock valued at around $50,000 is carried, and the firm is ready at all times to handle any work in their line. Among the many marine installations recently made by Jones Bros., is the insulation on the steam plant of the ferryboat City of Martinez

F. E. Jones is a practical marine engineer of many years' sea experience. He served his apprenticeship in the naval shops at Mare Island, and this training gives him a valuable knowledge of marine requirements. His brother, E. F. Jones, attends mainly to the office, and the combination works out well.

Auxiliaries—Ship Supplies—Marine Equipment

Spraco Lobster Claw Attachment



The Spraco Lobster Claw Attachment for paint spraying gun. With this attachment borders and lines can be followed as easily as with a brush.

WHILE it took nearly 4000 years to reach the first acceptable commercial turning-point in the method of applying paint, at its advent the original spray gun was ridiculed as a "squirt gun" and many skeptical allusions were made within the trade as to its performance. But even this crude forebear proved the clearness of the inventor's vision, for the paint sprayer, using this crude creation as a basis, crept slowly onward, perfecting his problems, and today has established spray painting equipment as a necessary factor within the industry.

The latest and most far-reaching unit discovery within the art of spray painting is the lobster claw attachment, which enables the spray operator to include every line within the architectural and industrial finishing fields, as this little auxiliary makes possible the cutting-in of trim, such as windows, doors, and mouldings; the drawing of line between bulkhead and deck; the finishing of pipes and fittings to any desired color scheme for identification; and the outlining of any structural member where desirable; thus permitting the entire vessel to be completed with great facility, while two-color work in such locations as interiors of staterooms and on such products as ship furniture can be completed without masking and with greater economy.

The illustration herewith depicts the last word in a spray painting device, carrying all attachments necessary to do all or any part of painting heretofore performed by the bristle brush. When one considers that in commercial use this spray gun has demonstrated superior surfacing of a 3 by 6-foot four-sash window frame within four minutes, one can get a fair impression of its possibilities.

Equipment.

There are two distinct types of spray painting equipment, the port- tionary type is used in connection with the painting of furniture, able and the stationary. The sta- automobiles, and other miscellaneous manufactured commodities. The portable equipment is of more particular interest to the marine engineer or shipbuilder, as it supplies a speedy, easy and economical method of painting on stationary objects, such as buildings, tanks, funnels, engines, machinery, and the interior and exterior surfaces of ship structure.

The last mentioned outfit consists of a portable container, of 3 to 15 gallons capacity, with control head for the regulation of air and paint pressures, one or more paint guns carrying the lobster claw attachment, which can be operated from one head if desired, an all-metal extension pole, air and material hose in lengths to meet all requirements, and a portable compressor unit, either gasoline engine or electric motor driven, with air storage tank, gauges, and safety valves — a complete up-to-date Spraco painting equipment.

Application Data.

While the spray method of painting uses slightly more paint than the brush method, none of the paint is wasted if the equipment is properly operated. Some comparative figures of spray painting and brush method are of interest.

A coverage of 4000 to 5000 square feet can be obtained in an 8-hour day, while as much as 10,000 square feet is often painted on large, free surfaces as compared with a range of 700 to 1100 square feet by the hand method. As a matter of average experience, spray painting uses approximately the same amount of paint but saves from 60 to 80 per cent of the labor cost.

The practicability of spray painting has been determined. The experimental stage has been passed and the spray-painted interior, as well as the exterior surface, has proved to be as durable and lasting as the brush-painted surface. The paint gun is blazing the way to save the surface at lower cost by increasing the yardage rather than through the lowering of wages. Its use is now covering a range from the tinting of pearls to the painting of battleships.

Babcock and Wilcox Expansion

THE Babcock & Wilcox Company announces that it has purchased the Fuller-Lehigh Company and its subsidiaries, manufacturers of pulverized fuel and cement mill equipment; also that it has purchased the Bailey Meter Company, manufacturers of meters and recorders, combustion control equipment, pulverized fuel feeders, and water cooled furnace walls. The Fuller-Lehigh Company and the Bailey Meter Company will be operated with the same organizations as heretofore, with the exception that Colonel J. W. Fuller will become chairman of the board of the Fuller-Lehigh Company, E. G. Bailey will become president, and A. E. Douglass of Fuller-Lehigh Company will become vice-president in charge of sales. Mr. Bailey will continue to act as president of the Bailey Meter Company, and R. S. Coffin will continue as vice-president and general manager.

By the acquisition of these companies The Babcock & Wilcox Company will be able to offer boilers, superheaters, economizers, air heaters, chain grate stokers, oil burners, pulverized fuel equipment, water cooled furnace walls, meters, and combustion control equipment; all in any combination that may be required to supply complete steam generating units.

Two Standard Steam Specialties

WHEN a man with a thorough knowledge of a particular line of goods makes a start for himself he generally succeeds. Such a man is the head of the C. E. Rhodes Company of San Francisco. For thirty-six years Mr. Rhodes has been identified with the manufacturing and handling of packing for steam and water machines. He served his apprenticeship in the factories; was later employed on special installations and as sales manager. He was with the Belmont Packing Company of Philadelphia for several years, then associated himself with San Francisco jobbers, and three years ago started the firm that bears his name and is its controlling stockholder.

From the commencement a fair share of business was secured, and the small shop first occupied was soon found too cramped for the growing trade. Larger quarters were secured, and for the past year the headquarters of the business have been at 17 Main Street, San Francisco. A large stock of Belmont packing of all kinds is carried, and the name Belmont has for years been synonymous with good material and well made articles. Besides these soft packings and sheets the C. E. Rhodes Company handles France metallic packing, which has a national reputation. Several steam specialties of the best kind are also sold by the firm, including those of the Standard Specialties Company of Indianapolis.

Associated in the business, as marine expert, is C. E. Lowe, a well known steamship engineer, whose knowledge of mechanics and engine needs is very advantageous to customers. Sizes taken by Charlie Lowe can be depended on to be right; something that marine men will appreciate when metallic packing is considered.

Speaking of the business, Mr. Rhodes is of the opinion that when a man sticks to one line he becomes expert at it, and as he has been some thirty-six years in the packing game, he must certainly know the how of it.

C. E. Rhodes

Steam specialties have been manufactured and sold for engineer's use for many years. Some of them are excellent, some fair, others merely junk. When a really good tool is invented and made right, it gets ready sale. Perhaps the articles made by the Standard Specialties Company, of Indianapolis, Indiana, can well be classed among the best. Their workmanship and design are excellent; structure is heavy without being clumsy; and they do the work they are intended to do with efficiency and economy. Reference might particularly be made of their pneumatic scaling hammers and quick action control valves for tube cleaners.

Both marine and stationary engineers will be interested in these two articles. In fact, they are such good sellers and have become so popular on the Pacific, as well as east, that the firm of C. E. Rhodes Company of San Francisco has taken the agency for the entire Pacific Coast. Many of these tools are being used on steamers and on land jobs. Such firms as the Standard Oil Company and Associated Oil Company have bought these two special adjuncts to the boiler room equipment for several of their plants, and satisfaction has been given.

The scaling tool is light but powerful. Made of the best of material, with a fine mechanical finish, its weight is about four pounds and it will strike light or heavy blows, from 3500 to 6000 per minute, with small expenditure of power. Its a pretty hard worker with a hand scaling hammer who can make more than 300 blows per minute, and these will not be uniform, either.

The patented control valve is also worthy of notice from the neatness of its design and readiness of operation. One man with it can do the work of two, and very much more advantageously as well, as it absolutely controls the action of the tool and will not close by the vibrations set up, though it readily closes and opens at the least touch of the operator. The rugged build and fine mechanical work put into the tools marks them as of the best.

Kolster Compasses

ARRANGEMENTS have just been completed between the American-Hawaiian Steamship Company and the Federal Telegraph Company for equipping the American-Hawaiian fleet with seventeen Kolster radio compasses. This is the natural outcome of the satisfactory performance of the Kolster radio compasses previously installed on the motorship Californian, motorship Missourian, steamship Dakotan, and steamship Virginian, all belonging to the American-Hawaiian Steamship Company.

The compasses to be installed on the seventeen remaining vessels are of the very latest type, including a single dial wave selector, an illuminated compass card for taking bearings in darkness, the receiver and wave selector being encased within the shell of the binnacle stand.

Following are the names of the vessels to be equipped:

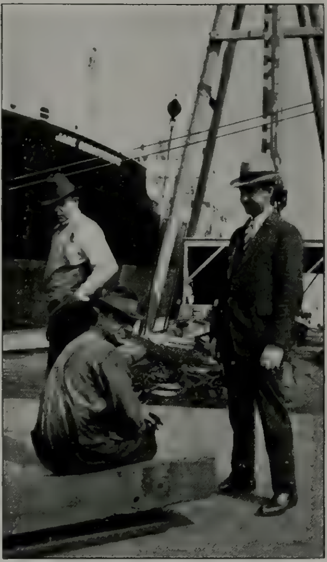
American
Columbian
Arizonan
Floridian
Georgian
Hawaiian
Iowan
Kansan
Minnesotan
Montanan
Nebraskan
Ohion
Oregonian
Panaman
Pennsylvanian
Texan
Kentuckian

The decision of the American-Hawaiian Steamship Company to equip their entire fleet with Kolster radio compasses is one more glowing tribute to the success of the Kolster radio compass, a Pacific Coast product, as an aid to navigation.

Smith-Rice & Co., Inc., Riggers

OVER twenty years ago the the firm of Smith-Rice & Co., Inc., was formed at San Francisco. The objective was the handling of heavy weights on ships and barges, the rigging of vessels, and the manufacture of stevedore's gear, such as slings, nets, and tents for hatches. The original firm was composed of two men, the late George Smith and late Captain Peter Rice. Mr. Smith was the descendant of a long line of riggers, records of his family showing that for nearly a hundred years the males of the line followed the rigging business. Captain Peter Rice, a native of Denmark, came out to California many years ago. He was a master of sailing vessels, and sailed for the Charles Nelson Company in several of the old time clippers. His death ended the original peronnel of the firm, but in his son, Charles Nelson Rice, a worthy representative of the policy and integrity of the company was left.

Charles Rice is a godson of the late Charles Nelson, who was a warm personal friend of Captain Rice. It is due to this that the young man bears his name, for his parents were intending to christen him Peter Christian. Captain Nelson, however, thought a more American-sounding name would be better, and so the change.



Charles Nelson Rice talking with his foreman.

Young Rice went through the regular grammar school days as a boy, but was too fond of work along the docks and in the rigging lofts to bother about higher education. He learned the business of his father in the good school of practical experience and application of energy and integrity, combined with thorough knowledge of massive weights and the best ways of handling them. And luckily he did know how, or the old firm would be now but a memory.

Born in Eureka, California, Mr. Rice has from his childhood been connected with ships, sails, and ropes. Before he could figure square root he knew how to make a carrick bend or a shroud knot. At the time of his father's death he took over the management of the business with all the courage and optimism of youth, and in the face of dull conditions during the past few years has built up a reputation for good work and ability second to none in his line. The firm now operates four derrick barges and can handle weights of almost unlimited tonnage. The barges are also fitted with salvage gear to take care of wrecks. Powerful pumps, which can take out hundreds of tons of water from a stranded vessel, are a part of the equipment. Chains, wire hawsers, mushroom anchors, and mats are always available, and when a job is tackled success is practically assured, as Mr. Rice has around him a crew of able, trained men, ranging from deep-sea divers to ex-boatswain's mates.

During the late war, Smith-Rice & Co. placed in the hulls of steamers built at a San Francisco Bay yard thirty large steam boilers of 55 tons each, and six others of 68 tons each, without a hitch or slip. Another job was the successful salving of an 80-ton locomotive crane which had tumbled through the wharf at Bay Point. This work was done with a wooden boomed derrick, designed by Mr. Rice. Many old timers said it could not be done; but it was.

Mr. Rice's personality and strict business methods have made for him many friends "along the front," and even his competitors admire him and his genial ways. The headquarters and storehouse of the firm are at 162 Steuart Street, San Francisco, though Rice himself is more often out on a job than at his desk.

Smith-Rice derrick barge.

Trade Publication

Some Developments in the Electrical Industry During 1925, by John Liston, has been issued as a 62-page publication (GEA-355) by the General Electric Company, Schenectady, N. Y. The review covers each phase of electrical application and its outstanding developments during the past year. It is divided into numerous sections, contains 103 illustrations and an index.

Thorkote

MARINE engineers have often been annoyed by the insulating material of steam pipes and boilers falling off when wet. To prevent this all sorts of schemes have been tried. A lagging of galvanized sheet iron has been used. This is all right for a time, but it soon rusts away. It has the disadvantage also of holding water between it and the insulation, and this feature is bad. Canvas sewed on and painted is also used. The cost of this, as well as that of the sheet iron covering, is great, and the results are far from satisfactory.

The Thorsen Company of Brooklyn, New York., experimented for some time with a view of finding something which, while not too expensive, would thoroughly protect insulated surfaces from water, wear, and rot. They at length evolved a compound to which they have given the trade name Thorkote. Its base is asphalt, which is inexpensive. The method of mixing, though, is one which permits the asphalt to retain all its elastic and waterproof qualities. It is not cut or dissolved by other chemicals, but rather made into an emulsion with water, the asphalt being very finely divided and then blended with a material to make it spread and cover as well as adhere to all surfaces. By mixing in the proper proportions with sand, plaster, paper fibre, sawdust, or other fillers, it can be used for an endless variety of purposes along the lines of protecting or insulating pipe coverings, boiler lagging, etc. It can also be used for waterproofing brick or cement walls, for coating refrigerator houses, for tanks and cisterns. In fact its uses are so many that space will not permit naming them.

Its best use, from the marine engineer's point of view, is the coating of insulating material on pipes and boilers. Applied here it keeps out water and makes a firm elastic surface which stands all kinds of rough treatment and holds up under strain.

The writer of this article recently saw a boiler which had been protected by Thorkote applied over the regulation insulation. This boiler was in a steamship that had been under extensive repairs. For weeks shipfitters, helpers, rivet boys, and almost everybody else, had been walking over the boiler. However, its surface was so well and solidly cared for by Thorkote that barring one or two very slight scratches the job looked as good as new. Had the old fashioned canvas and paint covering been used, most of the insulating material would have been in the bilges. Even had it been sheet iron covered there would have been holes and rust in plenty. As it was, two hours work and a couple of gallons of Thorkote and the job was as good as new.

Thorkote is especially adapted for protecting the insulation of steam pipes on deck lines to winches.

The California distributors of Thorkote are the Plant Rubber & Asbestos Works of San Francisco. This firm, specializing in quality goods, will give full information regarding Thorkote to those interested. The uses of this material are so varied that there is hardly an industry which could not use it to advantage.

Apexior No. 3

THE eating tooth of corrosion begins to bite from the very first day of steel construction. In ship hulls, bridges, and metal members of sky-scrapers rusting of the steel fabric is a constant menace. Various and many have been the methods adopted to prevent this serious deterioration. Paints with lead and oxide bases are used; plating with zinc (galvanizing) is also extensively employed, but this is a very expensive process.

Some ten years ago the Dampney Company, of Cardiff, South Wales, placed on the market a compound which was named Apexior Number 3. It was claimed that this chemical mixture when properly applied would completely arrest corrosion. Application of it was used on steamship bunkers, one of the worst places for the active action of rust, owing to the heat, fumes from the coal, and dampness. Trials seemed to show marvelous resistant and wearing qualities, and the use of Apexior began to be more general.

Owing to the high duty in the United States on such articles, a company was formed to manufacture it in this country, the Dampney Company of America being chosen as a name, and the factory located in Boston, Massachusetts. Before long Apexior began to be noticed. The claims made for it seemed upheld by the results, and its use became general in the eastern cities and ports. The Plant Rubber & Asbestos Works of San Francisco, dealers in such goods, became convinced that a market existed on the Pacific Coast for Apexior, and they secured the agency.

One of the earliest jobs on which it was used was the hull of the Standard Oil tanker Richmond. Here it showed a very marked improvement over former paints, as comparative tests gave Apexior a big lead in preserving and wearing qualities. It is also claimed that with its use as a first coating for ship's bottoms the use of zinc plates at propeller, injection valves, and rudder posts is entirely unnecessary. The Apexior appears to take the place of the zinc and produces equally good results.

The application of Apexior to the outer shell of a vessel is the same as any other good paint, but the metal surfaces must be cleaned to the bright shell. No old paint or rust should be allowed to remain. In the case of new work, all mill scale should be wire brushed off. After the Apexior is on, and two or more coats can be applied as it dries quickly, any good anti-fouling paint can be applied over it. The manufacturers do not claim it as a marine growth preventer, but they do claim it is non-corrosive and rust resisting. This alone should make it a very valuable article. It is a jet black color and is highly resistant to acid fumes, alkali, or acid solutions of moderate strength. It is stated by the manufacturers that it will stand dry temperatures up to 450° Fahrenheit and wet to 125° Fahrenheit without breaking down. Covering power is claimed to be great, and its use is highly commended for steel structures of any sort.

Marine Insurance

Developments of the Month

By CHARLES F. HOWELL, Contributing Editor

IMPORTANCE is attached by the courts to the warranty as regards the time of sailing. This point was recently emphasized in the trial of an issue before the Appellate Division of the Supreme Court of New York. The action was brought to recover $45,000, with interest, on a valued policy covering losses on the steamship Mohegan. The vessel sailed from New York with a general cargo for Rio and Bahia, but heavy weather forced her to put into Paramaibo for repairs. One of the points of dispute was with regard to the date of departure from this latter port.

The court held that the provision in the policy that the ship should sail from Paramaibo within ten days from a certain date constituted a warranty. The rule applicable to the case is laid down in Arnould on Marine Insurance and Average (11th. ed.), section 630, as follows: "No particular form of words is requisite to constitute an express warranty; it may be in any form of words from which an intention to warrant can be inferred. The word 'warranty' or 'warranted', for instance, is in no case necessary. The words 'to sail on such a day', or 'in port', or 'all well', on such a day, or 'carrying so many guns and so many men', etc., if written in the body, at the foot, or on the margin of the policy, would amount to an express warranty as much as any formal clause. Similarly a clause in a floating policy, 'declarations of interest to be made................as soon as possible after sailing of vessel to which interest attaches,' has been held by the privy council to be a warranty, not merely a collateral stipulation, the breach of which would only found a claim for damages; in some cases, indeed, it is not even requisite that there should be any explicit clause of warranty at all."

Commencement of Risk.

The above reflections lead naturally to a thought as to just when the policy attaches and the risk begins. And here again there is a warranty, this time implied; namely, that the risk shall commence within a reasonable time. It will be seen that this understanding is only fair, when one remembers that the hazards of voyages vary from time to time. For instance, insurance on a vessel from a port which is icebound for a part of the year is proportionate in its hazards to the nearness of the season of ice. It might not be much of a risk if there is an assumption of prompt sailing, but a month's delay would greatly alter the situation. The underwriter would, in all probability, not have considered writing the vessel and cargo at all if he had supposed any such was intended. Unless the sailing date is specifically agreed upon, it is implied that the voyage is to commence with reasonable dispatch. In case of unreasonable delay the underwriter may, if he so elects, decline to go on with the risk. Should he not be informed of the delay in the commencing of the voyage, until some loss has occurred, he may be entirely relieved of liability.

As regards the attachment of the policy, it may be stated that when unamended by modifying clauses it goes into effect immediately following the loading of the insured cargo on board the vessel at the loading port and the coverage continues until the cargo is safely landed at destination. In the case of loading at a wharf, at points where such is the custom, the risk attaches as soon as the vessel's slings lift the cargo clear of the wharf. If wharf cranes are employed, the attachment is when the wharf cranes release the cargo on the ship. In event of the port of loading being one where the vessel lies at anchor and loads from shore craft, unless there is special provision made to include the craft risk, the policy attaches only when the cargo is actually laden on the ocean vessel. The special provision referred to is usually taken care of by the inclusion of the following clause in the policy: "Including transit by craft, raft, and/or lighter to and from the vessel. Each craft, raft and/or lighter to be deemed a separate insurance. The assured are not to be prejudiced by any agreement exempting lighter-men from liability."

As the policy continues to attach until the voyage is over and the goods have been safely landed, the craft risk is covered where it is customary to discharge into lighters.

The Broader Cover.

It was the original intention in marine insurance to protect property at risk at sea, but the demands of the shipper's vicissitudes have led to a very considerable extension of the protection. Nowadays the marine policy covers on land as well as on the sea, and even in the air. It has therefore been necessary to define and enumerate the perils insured both prior to and subsequent to the waterborne portion of the coverage. Here is a sample of these modern clauses: "Goods while on land conveyances are covered against loss or damage caused by fire, collision, derailment, or by any other accident to the conveyance; while on docks or elsewhere on shore, against the risks of cyclones, hurricanes, and collapse and/or subsidence of docks, wharves, piers, or quays and also against fire and floods (meaning rising navigable waters) whether this insurance be F. P. A. or otherwise." These perils, it will be seen, are of the same character

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in the main as those enumerated in the familiar "perils" clause of the marine policy.

Warehouse to Warehouse.

The above paragraph leads to a consideration of that extension of land coverage known as the "warehouse to warehouse clause." This applies when the goods are in "the ordinary course of transit." Under this arrangement merchandise may be insured from the moment it leaves the shipper's premises until it is delivered at the warehouse of the consignee; and these two points may be far inland on both ends of the voyage. The idea is to insure the assured's property while it is out of his custody and control and while in transit. The liability of the underwriter has to do only with losses occurring fortuitously from the perils named.

The form of warehouse to warehouse clause most generally in use is as follows:

"The risks covered by this policy attach from the time the goods leave the shipper's or manufacturer's warehouse at the port of shipment, unless otherwise stated, and continue during the ordinary course of transit, including customary transshipment, if any, until the goods are safely deposited in the consignee's or other warehouse at the destination named in the policy, or until the expiry of fifteen days from midnight of the day on which the discharge of the goods hereby insured from the overseas vessel is completed, whichever may first occur. When the destination to which the goods are insured is without the limits of the port of discharge of the overseas vessel the risks covered by this policy continue until the goods are safely deposited in the consignee's or other warehouse at the destination named in the policy, or until the expiry of 30 days from midnight of the day on which the discharge of the goods hereby insured from the overseas vessel is completed, whichever may first occur. Transshipment, if any, otherwise than as above, and/or delay arising from circumstances beyond the control of the assured, held covered at a premium to be arranged."

The "Perils" Clause.

It may be well, in order to round out this discussion of marine insurance coverage, to remind our readers of the sea perils so inclusively enumerated in the "perils clause" which stands today practically as it was devised and expressed three hundred years ago. The whole category is there, in a single document. The archaic and interesting, but thoroughly effective, phraseology runs as follows:

"Touching the adventures and perils which the said insurance company is contented to bear, and takes upon itself in this voyage, they are of the seas, men-of-war, fires, enemies, pirates, rovers, assailing thieves, jettisons, letters of mart and countermart, reprisals, takings at sea, arrests, restraints and detainments of all kings, princes, or people of what nation, condition, or quality soever, barratry of the master and mariners, and all other perils, losses, and misfortunes that have or shall come to the hurt, detriment, or damage of the said goods and merchandises or any part thereof."

Force of Rubber-Stamped Clause

Recently Justice Shientag, of the New York City Court, went very thoroughly into the question of the perils of the sea, in the suit of Borgemeister v. the Union Insurance Society of Canton, China; but the views he then expressed with regard to the legal status of the rubber stamp clause in a policy are not those entertained by most underwriters. This has led to more or less disquietude on the part of the latter, for it is the consensus of opinion among marine insurers that a rubber stamp clause reading "to pay average, irrespective of percentage" would override a printed clause in the policy reading "warranted free from average unless the vessel or craft be stranded, sunk, or burnt." The underwriters maintain that in practice the use of the above rubber stamped clause is unquestionably intended to cover particular average howsoever arising; thus superseding the printed clause.

The opinion of the Justice was as follows:

"While it is true that a policy of an insurer containing its own words must be strongly construed against it and that an interlineation written or stamped on the face of the policy takes precedence over the printed words, yet it is only where a repugnancy exists between the written and printed matter that the written will prevail over the printed. The words "to pay average irrespective of percentage" clearly relate to the memorandum clause making the payment of average dependent upon a percentage of damage, and its purport is to eliminate the dependency of the payment of average upon the percentage of damage. The two clauses are in pari materia and should be read together. The stamped matter merely operated to qualify the memorandum clause by allowing recovery for any partial loss which under said memorandum clause could not otherwise be had. The printed matter, so far as the clauses are in anywise repugnant, yielded to the written or stamped matter. There is nothing in the stamped words inconsistent with or repugnant to the warranty under which defendant is liable for par-

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CHARLES R. PAGE, Manager
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

09 COLMAN BUILDING, SEATTLE, WASHINGTON

ticular average only if plaintiffs prove the vessel to have been stranded, sunk, or burnt, and hence such clause remains and must be given full effect."

The best American authority, William D. Winter, in his work on "Marine Insurance", has this to say with respect to printed, written, and stamped words:

"All policies consist in part of printed and in part of written or stamped words. The printed part expreses that which is common to all marine policies. The written or stamped portions set forth those facts and agreements peculiar to the particular policy. It therefore is presumed that the written or stamped portion was the subject of special consideration by the parties and when in conflict with the printed words, overrules or controls them. It is these written or stamped words and clauses which give rise to most of the disputes in regard to the interpretation of policies."

New Construction Risks Clause

A redraft of the London Institute's Construction Risks, Contract Value, and Period Clause has been made by the Institute in conjunction with the Liverpool Underwriters' Association and Lloyd's Underwriters' Association, and is now effective. The former wording was "full contract value to be the basis of the insurance;" but this was found to be unsatisfactory because in many instances there is no contract value. Furthermore, there was no provision in the old clause for any particular period, the result having been that insurances were placed for any length period with additional premiums for each additional month beyond.

The new wording is as follows:

"The period of construction and the price fixed in the builders' contract are warranted by the insured to be stated herein as the period and value for this insurance, but if there be no fixed contract price, the value herein stated is warranted to be the estimated cost at completion.

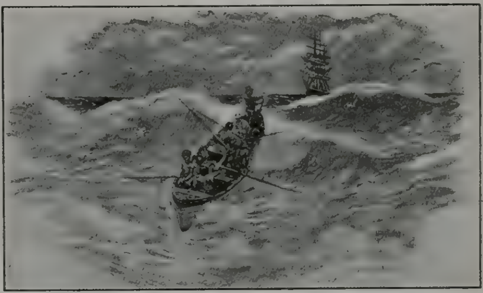
"If at any time during the currency of this policy the value at risk shall exceed the value insured when such has been arrived at by an estimate of the cost at completion, the insured shall demand, and the insurers agree to issue in proportion to their subscriptions, a supplementary policy to cover such estimated excess of value, the premium if any paid on the original policy, it being agreed that the supplementary policy shall follow the original policy as regards date of expiry and continuation. If the cost at completion shall be less than the amount for which insurance has been effected, the value shall be reduced accordingly, and the insurers agree to return the premium on the difference between the respective amounts.

"Drawings, patterns, and/or other material or articles loaned to the contractors and/or material of subcontractors or other parties for which the assured have contracted to be responsible shall be included in the insured value."

Salvage Awards

Issue is being taken by underwriters on both sides of the Atlantic to certain views on the basis of salvage awards expressed by T. L. Scott, of the Chapman & Scott Corporation, noted salvors, before the Propeller Club of Brooklyn a few days ago. Said Mr. Scott: "Many ships are covered by hull and disbursement insurance for at least twice their market value, and the underwriters pay the full amount in case of loss, but the courts have not yet come around to the view that the salvor has saved this amount."

The underwriters contend that Mr. Scott has confused intrinsic values and insured values as a basis of remuneration. They insist that were salvage awards based upon the insured value rather than upon the intrinsic value of the salved property an impossible situation would at once develop. For one reason, there would be a difficult basis for award in the case of insured and uninsured vessels; and, for another, in the case of insured vessels there would arise instances in which a heavy award would be granted for the salving of a vessel so badly damaged that an award based upon the insured value would come to more than a total loss. It is contended that in such a state of affairs underwriters would be disinclined to sanction salvage operations, probably preferring, in certain instances, to pay a total loss rather than take the chance of having to pay more than that for repair and salvage charges.



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Freights, Charters, Sales

March 16th, 1926.

THE wheat and barley market to United Kingdom/Continent is inactive and there is at present no demand for full cargoes. Parcel space has been secured at 22/6 to 25/- for April loading, though the regular liners are doing their best to hold on to 30/- or at least 27/6.

The Japan and China lumber market is also weak, only $9 being quoted for parcels, Mar./Apl., while as low as $8 is quoted for full cargoes for May/June.

The American intercoastal lumber is quoted at about $13 for foreign tonnage, while American tonnage could probably obtain $13.50-$14.

Charterers are quoting $13 for lumber to Peru/Chile, but this market is also easier. As a whole there is very little to attract owners to charter from the Pacific Coast at present. The rumors that a great deal of wheat is yet to be moved before the new crop arrives are still prevailing, and should the movement show any life the whole situation may change to the benefit of the owners.

The British stmr. Errington Court is reported fixed with grain from Vancouver to the United Kingdom, 26/8, Apl. loading, and Belgian steamer Trevier, Apl. loading.

The following fixtures are reported for grain to the Orient: Japanese stmr. Ryufuki Maru, British Columbia to Japan, Mar., Mitsui & Co.; British stmr. Huanchaco, Vancouver to North China, Thomas Harling & Son.

For lumber to Australia the following steamers are reported: British stmr. Aymeric, Mar., J. J. Moore & Co.; Danish m.s. Siam, lumber and petroleum products, $13 and $6, Mar., same charterers; Italian stmr. Ansaldo Settimo, Apl., same charterers.

The following steamers are reported fixed for lumber to the Orient: Japanese stmr. Kinryo Maru, Feb., Thorndyke Shipping Co.; Japanese stmr. Milan Maru, Mar., Nakagawa & Co.; Japanese stmr. Unyo Maru, Mar., Suzuki & Co.; Japanese stmr. Yoyoi Maru, Mar., Pacific Export Lumber Co.; Norwegian stmr. Storviken, Apl.

The British stmr. Elmbank is reported fixed for lumber from San Francisco and North Pacific to South Africa, Mar. loading, J. J. Moore & Co.

The following steamers have been fixed for lumber to the Atlantic seaboard: British stmr. Nile, 75c, charterers not mentioned; British stmr. Hollingside, Mar., H. R. MacMillan Export Co.; British stmr. Wentworth, same; Norwegian stmr. Hallgyn, Mar./Apl., $13.75; British stmr. Royal City, Mar., H. R. Macmillan Export Co.; British stmr. Dunrobin, prompt; British stmr. Watsness, to Cuba, Mar., McCormick Steamship Co.; British stmr. Queenmoor, $1.35, H. R. MacMillan Export Co.; Swedish m.s. Sydland, Mar.; American stmr. Frank Lynch, two trips, Apl., $16.

The following steamers are reported fixed on time charter: Norwegian stmr. August, North Pacific to North of Hatteras, Mar., H. R. MacMillan Export Co.; American stmr. Catherine G. Sudden, North Pacific to U.S. Atlantic, Apl., Doughs Ship Crane Co.; British stmr. Paris City, Pacific trade, H. R. MacMillian Export Co.; British stmr. Tritonia, British Columbia to North of Hatteras, lumber, delivery/redelivery North of Hatteras; British stmr. Handicap, one trip to Orient, delivery San Pedro, redelivery North Pacific, Robert Dollar Co.; Japanese stmr. Ryoka Maru, North Pacific to Japan or China, Yamashita Co.; Danish stmr. Bolivia, one round trip, delivery Australia; Danish stmr. Parana, same.

The American tanker Lompoc is reported fixed from the United Kingdom or Continent to Pacific Coast at 28/- per ton.

The following sales are reported: American stmr. West Montop, U.S. Shipping Board to California and Eastern S.S. Company; American stmr. Moravia Bridge, U.S. Shipping Board to Matson Navigation Co.; American stmr. General W. C. Gorgas, Panama Railroad Co. to Libby, McNeill & Libby; American stmr. West Cahokia, U.S. Shipping Board to Ocean Steamship Co., Savannah, Ga.; American tank steamer Lansing, Union Oil Co., to California Sea Products Co.; American m.s. Annie Johnson, Matson Navigation Co. to Captain L. Ozanne (to be changed to French Register).

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SAN FRANCISCO :: CALIFORNIA

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

Bids Called on Inter-Island Steamer.

Bids were opened at the office of Gibbs Bros., New York for construction of a first-class passenger and freight steamer for the Inter-Island Steam Navigation Company, Honolulu, Hawaii. The dimensions of the steamer are:

Length between perpendiculars	384'0"
Beam, molded	60'0"
Depth, molded	33'0"
Displacement, tons	7500
Indicated horsepower	6250
Speed, knots	16½

The vessel will be powered by two 4-cylinder triple expansion engines, steam to be supplied by six Scotch boilers. She will have accommodations for 400 first-class and 200 deck passengers, in addition to a crew of 112. The vessel will be specially equipped for the trade of the Hawaiian Islands. Bids were invited from Bethlehem, Staten Island, Sun, Federal, Cramps, Moore, and Newport News yards.

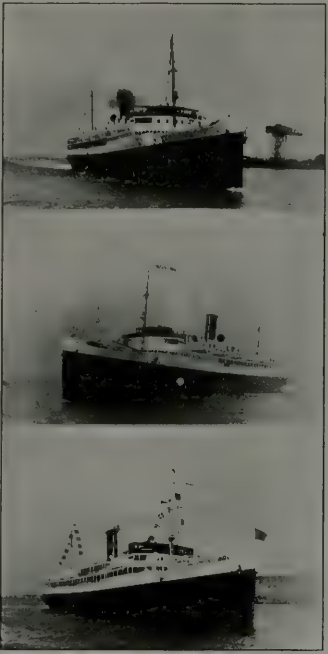
Bids were submitted by the Bethlehem Shipbuilding Corporation, Staten Island Shipbuilding Corporation, Sun Shipbuilding Corporation, Federal Shipbuilding & Dry Dock Corporation, Wm. Cramp & Sons Ship & Engine Building Co., Moore Dry Dock Company, American Brown-Boveri Electric Corporation.

Bids Opened for Coast Guard Cutter, New Bear.

Bids were opened March 4 at the office of the Coast Guard, Washington for construction of the new coast guard cutter No. 44 as follows:

Newport News Shipbuilding Drydock Co.	$585,000
Federal Shipbuilding Company	$589,000
Mare Island Navy Yard	$591,000

The cutter is for service in Alaskan waters. She is to be of diesel-electric drive, 216 feet over all, 39 feet beam, 15 feet draft and of 2050 tons displacement. Diesel engines have already been ordered from McIntosh & Seymour Corp.



Above are pictures of three vessels recently completed at the plant of the Newport News Shipbuilding and Drydock Corporation. They are, top, steamship Seminole, of the Clyde Steamship Company; center, steamship Mohawk of the Clyde Steamship Company; bottom, George Washington, of the Old Dominion Steamship Company.

Shipping Board Diesel Engine Installation Bids Submitted.

The Shipping Board received tenders from various eastern ship yards for installation of two sets of diesel engines now nearing completion at the plant of Busch-Sulzer Bros. Diesel Engine Company, St. Louis. They are 2-cycle, single-acting 3000 brake horsepower engines and bids for their installation were submitted as follows:

Bethlehem Shipbuilding Corp, for installation in the Seminole, $496,266, 120 days;

Federal Shipbuilding Corp., Siminole and Sawokia, $881,380, 170 days for first installation, and 185 days for second;

Morse Dry Dock & Repair Company, Seminole, $438,200, 120 days;

Newport News Shipbuilding & Drydock Company.

Southern Pacific to Build.

The Southern Pacific Steamship Lines, Pier 49, North River, New York, is planning one to three passenger and freight steamers. Dimensions are 445 feet long, 60 feet beam, 37 feet depth, steam engines and watertube boilers.

Plans Still Active for Red D Vessel.

Specifications have not yet been issued for a steamer for the Red D Line, 82 Wall Street, New York, but are expected to be published shortly by Theodore Ferris, naval architect of New York.

Two Great Lakes Stone Carriers To Be Built.

The placing of a contract for one and possibly two self-unloading stone carrying ships for the Bradley Transportation Company, Rogers City, Mich. is expected early in April. Carl. B. Bradley is president. The ships will be single screw, 600 feet overall, 20 feet draft, and will have carrying capacity of 12,500 tons. They will have steam engines and watertube boilers. All machinery and equipment will be of latest designs and they will be the largest and fastest of their type on the Great Lakes. The cost will be about $2,000,000 each.

Open Bids April 1 For Scout Cruiser.

The Navy Department, Bureau of Construction and Repair, Washington, D. C. will open bids on April 1 for the construction of Scout Cruiser Salt Lake City, which will be built in a private shipyard. Several of the eastern yards are working on bids to be submitted. The cruiser is to be propelled by geared turbines. The Navy Department has requested alternate bids for high pressure steam propulsion of about 700 pounds and for normal pressure steam propulsion of about 300 pounds or less. The Pensacola, sister ship, is to be built at a navy yard.

Dock For Newcastle.

The State of New South Wales, Australia, has decided to build a floating dry-dock at Newcastle to cost about $600,000. The Federal

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Government may assist in financing the construction.

Carfloats For Penn. R. R.

Samuel Porcher, purchasing agent for the Pennsylvania Railroad, at Philadelphia, has issued specifications covering the construction of four 250-foot steel carfloats. They will be built under the supervision of F. L. Dubosque, superintendent of floating equipment at New York and bids were opened March 22.

Specifications are in course of preparation and will be issued in the near future by the Shipping Board for diesel engine installations in a third group of two ships.

Pittsburgh Steamship Company to Build Freighter.

A contract is expected to be placed within a few days for the building of two 600-foot cargo boats for the Pittsburgh Steamship Company, according to reports from the Great Lakes. The vessels will cost close to $1,000,000 each and will be driven by steam engines, steam being supplied by watertube boilers.

Contracts Let for Small Craft

Orders recently placed for construction of fishing and other small craft include:

A 60-foot cannery tender for the Chinook Packing Company, which is building at the Erickson & Klepp Shipyard, Rainier, Oregon.

A diesel-powered vessel for the Merchants' Transportation Company of Tacoma is to be built by the Western Boat Building Company, Tacoma. She will be of fir 115 feet long, 32 feet beam, 10½ feet depth, and will have capacity of 450 tons of freight.

A 75-foot fish cannery tender for Matt Zobich of San Pedro will be built by the Harbor Boat Building Corporation, San Pedro, at a cost of about $30,000. She will be powered with a 135-horsepower Atlas-Imperial diesel engine, will have a capacity of 50 tons in addition to cold storage compartments, and will be built for transporting, from Mexican waters to Los Angeles Harbor, the catches of small fishing boats.

Vancouver Shipyards Limited, Vancouver, B. C., have an order for a 72-foot sealing vessel, the first to be built with anticipation of sealing activities being resumed by British Columbia interests when the sealing treaty terminates this summer. The vessel will be powered with a diesel engine, will have a beam of 22 feet, and be of strong fir frame, sheathed with ironbark, and ketch-rigged.

The Burrard Drydock Company, North Vancouver, B.C., has order for a small self-propelled tank barge for the Imperial Oil Company of Canada. This will be used for servicing the fishing boats along the British Columbia coast. The boat will be 95 feet long, 19 feet beam, 7 feet 2 inches depth, and will be propelled with diesel engines.

The Los Angeles Shipbuilding & Drydock Corp. may convert the former Shipping Board vessels El Abeto, El Cicuta, and El Cedro to oil tankers. This company owns the controlling interest in the vessels, which have been laid up at San Pedro for some time.

Standard Oil Company (Calif.), at San Francisco, is considering the construction of eight all-steel combination oil and general cargo tow barges for Calara, Peru. Bids have been asked from San Francisco shipbuilders, but the company has not yet decided whether or not to place an order.

Shipyard Notes

Lake Washington Shipyards, Houghton, Washington, are rebuilding into a ferryboat the former freight steamer Chippawa for the Puget Sound Navigation Company. The boat is 220 feet long, 34 feet beam, and 14 feet loaded draft.

Ballard Marine Railway Company, Seattle, is building a survey and patrol boat for the United States Bureau of Biological Survey, for use in Alaskan waters. The vessel was designed by L. H. Coolidge of Seattle. She will be 68 feet long, 16 feet beam, 10 feet 5 inches molded depth, and is to be equipped with a 135-horsepower diesel engine. She will have a cruising radius of 6000 miles and accommodations for 12 men. The boat will be equipped with a laboratory and refrigerator space.

Charles Nelson Company, lumber and shipping firm of San Francisco, has purchased the defunct De Young shipyard at Alameda, California, and will hereafter use this plant for the repair and conditioning of their fleet of lumber carriers.

On February 27 the first of the two diesel-electric tugboats for the Wilmington Transportation, Wilmington, California, was launched at the yard of William Muller. She was named the John N. Stewart. The tugboats are 95 feet long, and are to be powered by 430 shaft horsepower double armature type Westinghouse motors, operating up to 150 revolutions per minute. Two Winton diesel engines of 300 horsepower, 6-cylinder, 4-cycle type, are to be direct connected to two 715-kilowatt generators operating at 450 revolutions per minute. These tugs will be described in detail in a later issue of Pacific Marine Review.

The Portsmouth Navy Yard and the Mare Island Navy Yard are preparing estimates for the construction of submarines V-5 and V-6 respectively.

The Navy Department on March 1 granted a contract to the Kiangnam Dock and Engineering Works, Shanghai, China, for the construction of River Gunboats Nos. 43 to 48 inclusive. Engines for Nos. 45 to 48 are to be built at the New York Navy Yard.

The New York Navy Yard is preparing estimates for scout cruiser Pensacola, which will be built at a navy yard.

Crowley Launch & Tugboat Company, San Francisco, has placed order with the Pacific Diesel Engine Company, Oakland, for two diesel engines of 250 horsepower each, which they will install in two new tugboats to be built at their own plant. The construction plans of this company include the building of six lighters, 125 by 40 by 12 feet, and four tugboats.

Bath Iron Works, Bath, Maine, which is in the hands of receivers, will be auctioned the end of March by the Industrial Plants Corporation, 25 Church Street, New York, Charles Kriser, President. The plant of fourteen acres, 1400 feet of deep waterways, with improvements, and all machinery, equipment and supplies will be sold.

Recent Contracts

Newport News Shipyard to Build Cutter New Bear.

The Newport News Shipbuilding

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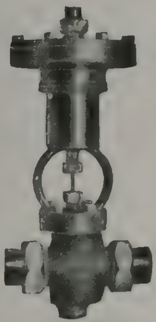
Type

Pressure Governor No. 10
For Marine Pumps



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In Pacific Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairs

& Drydock Company, Newport News, Virginia, was awarded contract for the construction of the new Coast Guard cutter No. 44, which will replace the cutter Bear in Alaska service. Her completion date is scheduled for May 1, 1927.

Manitowoc Gets Order.

Manitowoc Shipbuilding Corporation, Manitowoc, Wisconsin, has an order for the Newaygo Portland Cement Co., Newaygo, Michigan, for a steel freighter for Great Lakes service, to cost about $400,000.

Lake Washington Shipyards, Houghton, Wash., has orders for two yachts, one for Frank Manz, 56 ft. long to be powered with a 100 indicated horsepower Hall-Scott engine; the other of 50-ft. length to be powered with a 100 horsepower Eastern Standard engine.

St. Helens Ship Company, St. Helens, Ore., has order for a tender for the Lighthouse Dept. engined with 100 horsepower Washington-Estep engine.

American Bridge Company, Pittsburgh, has an order for twenty-five barges and three towboat hulls for the Cargegie Steel Co.; and an order for six barges for The Barrett Line of Cincinnati.

American Brown-Boveri Electric Corp., Camden, N. J. has a contract for four carfloats for the New York Central Railroad, 366 feet long, with two tracks and a platform.

Defoe Boat & Motor Works, Bay City, Mich., has an order for a speedy wood yacht. It is for W. C. Rands of Detroit, will be 83 ft. long, 15 ft. beam, 3 ft. 6 in. draft, and will have gas engines developing 1200 horsepower, giving a speed of 35 miles.

Howard Shipyard & Drydock Co., Jeffersonville, Ind., has contract for a steel hull for the steamer Mississippi of the Mississippi River Commission.

Nashville Bridge Co., Nashville, Tenn., has new orders for a barge and a towboat hull.

Spedden Shipbuilding Co., Baltimore, Md., has contract for a steel hull towboat for G. F. Pettinos of Philadelphia to be 87 ft. over all and powered with 400 horsepower Ingersoll-Rand diesel engines. They also have an order for a steel hull ferryboat for Peninsular Terminal Co., Miami Beach, Fla., to be 115 ft. over all and powered with 360 horsepower Fairbanks-Morse diesel engines.

Keel Layings

Twin screw passenger and freight steamer for Eastern Steamship Lines by Wm. Cramp & Sons Ship&Engine Building Co. Feb., 23.

Bo Peep II, wood yacht for I. M. Kirlin of Detroit by Defoe Boat & Motor Works, Bay City, Mich., Jan. 15; and wood yacht for Alex McLeod, Detroit, Feb. 1.

Louisiana, steam ferryboat for Baton Rouge Transportation Co. by Howard Shipyard & Drydock Company, Jeffersonville, Ind., February 20.

Josephine, diesel yacht for E. S. Burke, Jr., by Newport News Shipbuilding & Drydock Co., Feb. 1.

Launchings

Gulfcrest, diesel tanker by American Brown-Boveri Electric Corp., for Gulf Refining Co., Feb. 27.

Gouverneur, diesel-electric towboat for U. S. Engineers, St. Louis, by Howard Shipyards & Dock Co., Jeffersonville, Feb. 16.

Wicomico, tugboat for Pennsylvania Railroad, by Sun Shipbuilding Co., Feb. 27.

WM. CORNFOOT, President GEO. RODGERS, Sec'y-Treas.

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In Atlantic Coast *Shipyards*

Ship Repairing ~ Ship Building ~ Reconditioning ~ Engine Repairing

Two steel barges for the Kelly Axe & Tool Co., by Chas. Ward Engineering Works, March 1.

Deliveries

Two steel dump scows for American Dredging Co. by Wm. Cramp & Sons Ship & Engine Building Co., Feb. 24.

Kings Landing, towboat by Nashville Bridge Co., Jan. 15.

Repairs

Bids were opened recently at Portland, Oregon, for conditioning for active service the Shipping Board steamer Wawalona as follows:

Albina Engine & Machine Works, $10,980; Albina Marine Iron Works, $10.795; Smith & Watson Iron Works, $10,875; Willamette Iron & Steel Works, $11,280; Central Engineering Works, $12,000; Robert McIntosh, $11,714, all of Portland.

The Newport News Shipbuilding Company was low bidder for the reconditioning of the United States Line steamship President Roosevelt, at a price of $186,969, when bids were opened on March 10. Owing to the disastrous fire on the steamer America, which was just completing extensive repairs at the Newport yard, the immediate placing of the Roosevelt contract may be delayed as it may be deemed necessary to keep the Roosevelt in action pending adjustment of the situation created by the loss of the America's service.

Tietjen & Lang Drydock Company, Hoboken, N. J., have been awarded by the Eastern Steamship Company the repairs to the steamer Jefferson, at $87,840, and the Ocean Steamship Company of Savannah freighter Lake Elmhurst, at about $60,000.

The wood steamer Sierra, owned by the E. K. Wood Lumber Company, San Francisco, suffered $50,000 damage when her machinery section and part of her cargo hold were burned while she was docked at Los Angeles Harbor recently.

San Pedro Works, Union Plant, Bethlehem Shipbuilding Corporation, is reconditioning the Union Oil tanker Coalinga at a cost of about $100,000.

Union Oil Company of Canada to Build Tank Barge.

Tank barge for operation in British Columbia coastwise service is planned by the Union Oil Company of Canada, Vancouver, B. C. She will be 90 feet long and will carry about 2100 barrels of oil. Cost to be about $50,000.

Todd to Repair Freighter Derblay.

Todd Dry Docks, Inc., Seattle, were awarded contract for repairs to the Shipping Board freighter Derblay on a bid of $71,400. The Derblay was damaged by going aground on the coast of Ecuador.

The Sun Shipbuilding Company, at $97,800 and 65 days' time, was the low bidder for a general reconditioning of the steamer Ontario of the Merchants & Miners Transportation Co., Baltimore, on March 3. Other bids were: Newport News, $103,600 and 60 days; Morse, $113,000 and 120 days; Robins, $119,500 and 90 days; Bethlehem, $133,330 and 70 days; Atlantic Works, $133,500 and 80 days; Cramps, $150,800 and 90 days; Maryland Drydocks, $170,000 and 82 days. Award pending.

Todd Shipyards Corporation was low bidder for general reconditioning of hull and machinery of the steamship Jean of the Bull Line—$139,434.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Richlube, hull 5328, diesel-electric self-propelled barge for Richfield Oil Co., 180′ 6″ L.B.P.; 32′ molded beam; 12′ molded draft. Atlas-Imperial diesel engs.; Westinghouse motors, capacity 7000 bbls. oil; keel Jan. 9/26; **launched Mar. 15/26.**

San Pedro Works

Richfield No. 2, hull 5329, oil barge, Richfield Oil Co.; 131 L.B.P.; 40 molded beam; 11′ 6″ molded draft; capacity 7000 bbls. oil; keel Jan. 18/26; [illegible]

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Piling in all Lengths

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Company
Gerlinger Bldg., Portland, Ore.

Boom at Willbridge in Portland Harbor
Warehouse and Yard at Linnton, Ore.
Upper River Boom at Butteville, Oregon.

Plumbing Fixtures on the Malolo

continued from page 172A

room accessories, such as towel shelves and towel bars, are a combination of polished white glass and white metal. Tumbler and vase holders are of polished white metal of heavy pattern.

A. B. Sands & Son Company has furnished this same class of fittings for the Leviathan and other large passenger liners.

Elevator Equipment for Malolo

THE alevator equipment for the steamship Malolo under construction at the yards of Wm. Cramp & Sons Ship & Engine building Company consists of two passenger elevators, one linen elevator, and two stores elevators, all of the electric type operated by direct current furnished from the main power plant of the ship.

One of the passenger elevators travels from A to F decks, a distance of about 45 feet, making six stops. The other travels from A to E decks, with five stops. Both machines have a maximum net capacity of 2500 pounds and travel at a speed of 150 feet per minute, and operated by regular car switch control. The platforms are about six feet square, and the cars are of mahogany finish with solid bronze gates and grilles of a very attractive design.

The linen elevator has a capacity of 1800 pounds at 50 feet per minute, traveling from B to F decks, and operating by key buttons for automatic control. No regular operator is required, but only authorized persons having keys can operate the elevator. The platform is 6 x 5 feet and is enclosed 6 feet high with sheet steel wainscoting, with a wire grille above and over the top.

The two stores elevators have a capacity of 3000 pounds at 50 feet per minute, traveling from D to F decks, making three stops. These freight elevators also have automatic push button control operated by key buttons. The platforms are about 4 feet by 4 feet 9 inches.

In awarding the contract for the elevator equipment on the ship, the builders and owners were very particular to make sure that all parts of the equipment were going to operate satisfactorily under all conditions of weather, with utmost realibility of service and with minimum upkeep. The contract was, therefore, awarded to the Otis Elevator Company, who are foremost in the elevator field and have had much experience in installing elevators on board ships.

Woodoleum

APPROXIMATELY 90,000 square feet of Woodoleum deck covering will be laid on the steamship Malolo. The architects, Gibbs Brothers, and the builders, Wm. Cramp and Sons Ship and Engine Building Company, exercized great care in selecting a deck covering suitable for the various conditions.

Woodoleum will be used in various types in the large public spaces, passageways, and dining saloons. Some will be laid suitable to receive top-tile, other spaces to be covered with carpet, and some spaces with the natural Wooloeum.

This material is being supplied by the Penna. Flooring and Woodoleum Mfg. Co. of Philadelphia.

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Diesel Engines

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Dependable Service Free from Trouble

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126 PINE STREET, SAN FRANCISCO 402 DELTA BUILDING, LOS ANGELES

The Board Sling

THE use of board slings for handling freight has been common for many years, but it is believed that the development of the method has been brought to its present point of perfection in the port of San Francisco.

By "board sling" is meant a board platform, on which a sling load of package or other freight is lifted by ropes at the four corners, kept apart by stretchers so that packages are not jammed, and the whole is swung as a unit to the hold of a vessel. Hold freight from the vessel may be lifted out by the same means, and the several slings landed on lighters or on the piers and there unladen, the method being workable both ways.

It is obvious that slings of this character are especially adapted to mechanical transport, where the entire slingload can form the unit loading of a trailer in a train drawn by a tractor or can be picked up by an overhead telpher on a monorail system.

In loading, the trailers are taken alongside the cargo pile, with board slings on them. The cargo is piled on the slings in loads to suit, and a number of trailers so loaded are towed to a position opposite the hatch designated and rapidly taken on board. To do the same work by man propelled trucks would increase labor, extend time, and make for a higher average of broken packages and pilferage. In fact, it has been proved by records that over 20 per cent of handling costs are saved by the tractor-trailer-board sling method over the old style of doing the work. In discharging freight, the board slings are loaded in the hold, swung out, and landed on the trailers on the wharf alongside, then hauled into the warehouse or pier shed.

The advantages of this manner of handling freight are obvious, and they are many. First, this method prevents a lot of breakage, as the lift does not crush the several units. Second, it facilitates rapid loading and unloading. If, for instance, a vessel were calling at an outside port where rapid dispatch is important on account of bad weather or other reason, these board sling loads could be left on the lighters and from them hoisted out at the shore side, the slings being returned next trip and perhaps filled with cargo when so returned. Any of our readers familiar with Central and South American trade will get the point at once.

Then again, this way is very advantageous at larger ports like San Francisco. It is well known that when freight is delivered on the piers certain sections are designated by the stevedore for certain ports. Hundreds of tons of freight are piled ready for the next steamer. She comes in and docks, and then it is found that owing to perhaps a part of her cargo having been put on board at another port, the stowage on the piers is not at the point opposite the hatch it is to go into. This seems to be more often the condition than otherwise, and it entails a great deal of labor to transport this cargo for several hundred feet along the dock from its pile to the hatch it enters. Here is where the board sling comes in handy, together with its able assistant the tractor-trailer train.

The construction of board slings is simple, and there is no patent on them. On the San Francisco waterfront they have been perfected and improved by many men in the stevedoring business. Captain Fremont Nash, Captain James Gade, Captain Van Dusen, Mr. Horseman, and others have helped to develop these board slings and their use in combination with tractors and trailers. George Armes, president of the General Engineering & Drydock Company, San Francisco, has given much good engineering advice in the design and construction of the trailers. His firm has built many of them, and where strength was found to be needed it has been added, with the result that a standard trailer built by the General Engineering Company is much in use. In combination with any standard tractor the advantages are ahead of hand work as much as the modern electric hoist is ahead of the old time "crab winch" hand operated.

Marine Electricians

ETS-HOKIN & GALVAN, marine electricians at 181 Steuart Street, San Francisco, were not the first ones in the business; but since their establishment attention to all kinds of marine electric work has gained for them a very enviable reputation. Besides the San Francisco house, they have a branch at 240 Canal Avenue, Wilmington, California. Specializing as they do in marine installations and repairs, their workmen have become very expert and competent, which is a great advantage to their business.

A complete stock of everything electrical is maintained, as well as several appliances that are difficult to obtain at short notice. Batteries for all kinds of service, together with complete radio outfits for sea and land use are available.

A special line of small and large pumps, suitable for any sort of work and operated by any kind of power from hand to full diesel, is one of the most outstanding features of this firm's equipment. These pumps are built by the American Machine & Foundry Company of Brooklyn, and the firm of Ets-Hokin & Galvan are the sole agents for the Pacific Coast. These pumps are used extensively on yachts, workboats, sailing craft, large steamers, barges, and motorships. They are of fine design and construction, with evidence of careful attention to mechanical completeness, and are adaptable to any type of drive.

Ets-Hokin & Galvan also handle a generating unit of their own design, which, at very reasonable price, provides for a small electric plant, complete in all details. The generator, with gas engine drive, is but 18 inches high, 25¼ inches long, and 12½ inches wide. Within this space is a light and power plant capable of delivering 300 watts.

Detroit Multiple Retort Underfeed Stokers are described in a new 24-page bulletin just issued by the Detroit Stoker Company. Illustrations bring out many special features, such as the level fuel bed and the method for controlling movement of the fuel throughout the entire process of combustion. The applications shown cover a wide range of operating conditions and include installations with preheated air, the burning of wood refuse with coal at high ratings, etc. Copies may be had by writing the Detroit Stoker Company, 103 General Motors Building, Detroit, Michigan.

Personal Paragraphs and Items of Interest

Washington-Estep.—W. H. Worden, president of W. H. Worden Company, Inc., California representatives of Washington-Estep diesels, announces the opening of Southern California offices at 402 Delta building, Los Angeles. F. W. Ward is Los Angeles manager, and James P. Browner, diesel engineering specialist. Mr. Browner was formerly San Francisco sales manager of the Western - Enterprise Engine Company.

New Jersey Asbestos.—H. S. Fitz Gibbon, president and general manager of the New Jersey Asbestos Company, has personally made a survey of Pacific Coast marine supply conditions, and the firm is expanding the service on "V" Pilot and Gladiator packing and Woodite rings through Squires and Jones, Pacific Coast managers, in San Francisco, Los Angeles and Honolulu.

Foard - Barstow.—Twenty - four Elto outboard motors for small craft have been sold recently in and about the San Francisco Bay district by Foard-Barstow Ship Chandlery Company, 101 Drumm street. The 1926 Super-Elto model is attracting widespread attention. These popular power plants are made by the Elto Outboard Motor Company, Ole Evinrude, president, Milwaukee, Wis.

Chas. Johnson Post.—Every member of our staff joins in praise for the invaluable work accomplished by Charles Johnson Post, publicity and promotion expert par excellence, in telling the world all about the super-liner Malolo. Post's ability in promotion work covers not only editorial enterprise, but his facility with pen and camera enables him to turn material into the presses, dailies, weeklies and monthlies, that ordinarily would occupy the genius of an entire staff of exploitation experts.

Chas. P. Wetherbee.—Westinghouse Electric & Manufacturing Company, announces that Charles P. Wetherbee, widely-known marine engineer, has joined the engineering staff as consulting engineer on marine work, in which capacity he will be attached to the South Philadelphia Works. Wetherbee earned international fame during his thirty years of service with the Bath Iron Works, Ltd., Bath, Maine. Beginning his career with that organization as draughtsman, Wetherbee rose to the position of vice-president and superintending engineer.

E. O. Shreve.—The General Electric Company announces that E. O. Shreve has been named manager of the industrial department, with headquarters at Schenectady, filling the vacancy caused by the recent death of A. R. Bush. Shreve was manager of the San Francisco office of the General Electric organization since 1918. He joined the firm in San Francisco as supply salesman twenty years ago.

Ira J. Diem.—McCormick Steamship Lines recently appointed Ira J. Diem assistant manager for the company at Seattle. Otto H. Eisenbreis is general agent. Diem launched into marine work in 1912 as chief clerk of the Frank Waterhouse organization. With the McCormick Lines he will center his activity in charge of foreign shipments.

W. T. Morgan.—This well-known super cargo of Yamashita Company, Inc., in Seattle, has been appointed manager of the Portland offiice, succeeding Hector M. Hunt, formerly of Seattle, who was named Kobe agent of the Columbia Pacific Shipping Company of Portland.

Chas. L. Wheeler.—Completing arrangements for the Pacific-Argentine-Brazil Line, the Pacific-Carribean service and the Pacific-Havana-Jacksonville Line, Charles L. Wheeler, vice-president and general manager of the McCormick Steamship Lines, who are Pacific Coast agents for the Munson-McCormick Line, recently returned to San Francisco, after an inspection of the company's properties in Southern California.

L. J. Galbreath.—Until recently engaged in advertising and sales promotion activities for the Bridgeport Brass Company, L. J. Galbreath has joined the American Brown-Boveri Electric Corporation to take charge of publicity and sales promotion for that company as assistant to Earl G. Hines, recently appointed general sales manager. Since graduation from Cornell University in 1917, Galbreath has served in executive and publicity capacities with the Niles-Bement-Pond Company, 111 Broadway, New York, N. Y., the Columbia Machine Works, and Malleable Iron Company, Brooklyn, New York, with the exception of time served afloat during the late war as an engineer officer in the U. S. Naval Reserve Force.

Electric Night by Radio, issued by the General Electric Company of Schenectady, N. Y., as publication GEA-324, contains the addresses which were broadcast on "Electric Night," October 21, 1925, from eighteen broadcasting stations in the United States. This national celebration was sponsored by General Electric to commemorate the 46th anniversary of the Incandescent Lamp and to pay tribute to Thomas A. Edison.

History, progress, rural electrification, public relations, and many other subjects relating to the electrical industry are discussed. Among the thirty-two speakers were two members of the Cabinet, Herbert Hoover, Secretary of Commerce, and William M. Jardine, Secretary of Agriculture, in addition to officials of banks, electrical associations, central station companies, and manufacturers.

Charles F. Tabarett.—A former chief engineer, is now associated with the Goodwin-Wright Company electrical engineers, 324 Mission Street, San Francisco. Mr. Tabrett is a son of the late Harry Tabrett, who was one of the best known marine engineers on the San Francisco waterfront. For many years he was outside superintendent for the Risdon Iron Works. The younger Mr. Tabrett is making a good record for himself in his work, and is always glad to meet old marine friends.

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Total fuel consumption cut 35 per cent by using Diesel-electric instead of steam auxiliaries

THE "Benowa" was originally intended to be a steamship, but after the Australian Government's experience with other Diesel-driven ships, its Engineers, although old steam engine men, recommended Diesel main engines and electrically driven auxiliaries.

The Diesel propulsion gave the same satisfactory results as in the earlier installations, and the electric auxiliaries completed the benefits of the low fuel consumption of the main engines. **These electric auxiliaries take only about 70 gal. of fuel per day as against about 600 for steam auxiliaries, thereby reducing auxiliary consumption from about 40 per cent. to about 5 per cent. of the total fuel.**

Full-Diesel operation will win out over steam-driven auxiliaries under almost all conditions and conversion of auxiliaries to Diesel-electric drive can usually be made to pay exceptional profits on the investment.

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The Matson Steamer Manoa is one of the nine vessels of this fleet equipped with the Kolster Radio Compass

SAFE!

With a Kolster Radio Compass!

Nine vessels of the Matson Navigation Company are equipped with the Kolster Radio Compass—SAFE—from the dangers of fog or misty weather.

Any one of the vessels of this fleet can, with the aid of the Kolster Radio Compass make port without delay during a dense fog or periods of low visibility—OR—can pass other vessels at sea during stormy or foggy weather. SAFE!

Over eighty million dollars in ships—on the seven seas — under fifteen house flags — are protected by the Kolster Radio Compass. Have your vessels this protection?

Write now for Bulletin 25

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Japan - China Representatives:
Sperry Gyroscope Co., Mitsui Building, Tokio

FEDERAL CONTINUOUS WAVE RADIO EQUIPMENT

The Ocean Bill of Lading

(Continued from Page 151)

sults of the conference, promulgated as The Hague Rules of 1921, were issued, these objections were met as follows:

(1) Preclude the insertion of negligence clauses, and substitute for them provision throwing responsibility for the safety of the goods upon the carrier—the limit of whose liability is raised from a nominal figure to £100, or $500, per package or unit.

(2) Allow a year for presenting claims.

(3) Make the carrier responsible for pilferage and other risks, and throw on him, instead of on the claimant, the burden of proof—that is, if the carrier does not deliver the goods as described, he must give evidence exonerating himself from the responsibility or pay the claim.

(4) Give the carrier no right to the benefit of any insurance effected by the cargo owner.

Thus, it would be seen that the shipowner made great concessions. It must be borne in mind that the adoption of The Hague Rules was purely a voluntary act to be performed by the owners. The adoption of the rules by any company would have meant that a short form bill of lading would have been issued stating that conditions were "as per The Hague Rules of 1921" and would have included merely such few other clauses as might pertain to the particular commodity or trade involved. Such a system would greatly simplify and tend for vastly increased definiteness in bills of lading. Some steamship lines adopted The Hague Rules, but not many. Furness, Withy & Company, however, issued over fifty thousand bills of lading under The Hague Rules without a single case of litigation, or even dispute, as to the meaning and construction of the terms of the rules.

Brussels Diplomatic Conference—October, 1922.

The opposition of certain bodies to The Hague Rules in the precise form agreed upon, and the insistence in certain quarters upon a compulsory rather than a voluntary code, led to further meetings between shipowning and cargo interests, culminating in the Diplomatic Conference held at Brussels in October, 1922, when an agreement was reached and a protocol signed, which will become an international convention upon ratification by the governments represented by the signatories.

The convention is based on The Hague Rules of 1921 and is substantially similar to those rules. The convention aims at codifying and unifying, by an international agreement, the dissimilar laws and practices of the world's maritime countries relating to bills of lading. The general adoption of the convention would have the effect of establishing a recognized code of conditions; would remove anomalies which exist at present; would obviate the necessity for the inclusion of many of the numerous clauses now necessarily appearing in most modern bills of lading; and would simplify and standardize, on an international basis, the conditions common to ocean bills of lading.

Results of the Brussels Conference.

Of the twenty-four nations represented at the Brussels Conference, the United States and Great Britain are so preeminent in the shipping world that their action will naturally set the example for the others.

Great Britain: In November, 1923, the Imperial Economic Conference met in London and passed resolutions recommending the Rules for adoption by the governments and parliaments of the British Empire. In February, 1924, the Carriage of Goods by Sea Act was introduced in the House of Lords and was finally passed by both houses August 1, 1924, and became effective for British shipping on January 1, 1925. Thus, in Great Britain and Northern Ireland the main substance of the original Hague Rules, instead of being a proposition to be voluntarily adopted by shippers and shipowners now has the force of law, and it is compulsory that they form part of the terms of each bill of lading issued. The British bill of lading is, therefore, at the present time a very concise document and one whose terms and conditions are well understood and acceptable to shipper as well as to shipowner.

United States: In this country this matter was first introduced in the House of Representatives in December, 1922, in HR Bill 14166. Extensive hearings were held on this bill in February, 1923. Considerable opposition developed in various quarters, principally among the American Meat Packers, the National Industrial Traffic League, and the American Steamship Owners' Association. The objections were aimed primarily at the exact form of the bill. It was generally recognized that the principle of standardization and simplification of the bill of lading was sound.

The provisions of the Brussels Convention were again introduced in the House on January 9, 1924, in what was known as the Edmonds Bill (HR 5080.) A substantially similar bill was filed in the Senate on March 24, 1924. Both of these bills met with opposition and shared the fate of the bill in the previous session. In any event, the hearings held on these bills have thrown much light on certain imperfections and it is confidently expected that this session of Congress will witness the passage of a bill embodying the Brussels convention but modified slightly to meet strictly American conditions.

When the results of the Brussels Convention have been put into force generally by the maritime nations of the world a great progressive step will have been taken in shipping.

The Isherwood System

(Continued from Page 156)

weight of material is claimed as the steel saved in the displacing of the brackets is utilized for increasing the sizes of the skin longitudinals and the horizontal bulkhead stiffeners, and indeed it is expected that for given dimensions the bracketless ship will be slightly heavier than the straight Isherwood ship.

Looked at from the point of view of the shipowner, it is difficult to conceive of any tankship owner being unwilling to make some very slight concession in the matter of deadweight to secure immunity from the ever present bug-bear of leakage at the bulkhead bracket connections, with the consequent expense of upkeep which in the life of the tanker becomes a serious matter, whilst at the same time securing a structure which offers every facility for rapid and efficient cleaning and expedition and economy in repairs.

The aspect which has made a very strong appeal to the shipbuilder is the further simplification of construction as compared with the Isherwood system and

A tanker of 10,750 tons deadweight carrying capacity is at present in course of construction at the Jarrow Yard of Palmers Shipbuilding & Iron Co., Ltd., and the highest class of Lloyd's Register will be assigned to this vessel.

The "ECUADOR" is one of three vessels of the Panama Mail fleet equipped with the Federal *Continuous-Wave* radio set

THE "ECUADOR"
reports direct
and daily
from San Francisco to New York
with a FEDERAL C-W RADIO SET

Almost every day Masters marvel at the sterling performance of Federal C-W Marine Radio Sets.

Recently, the "ECUADOR," one of three vessels of the Panama Mail fleet equipped with Federal C-W radio sets, reported *direct* from ship to owner— *consistently*—during the entire trip from San Francisco to New York.

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When may we equip your vessels with LONG RANGE radio communication sets?

SPEED-EFFICIENCY-RELIABILITY
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The great fleet of modern ships which constitutes the United States Shipping Board World Freight Service makes frequent sailings to all parts of the world, providing an efficient service which merits the preference of every shipper.

In addition to freight vessels especially adapted to meet the needs of the particular trades they serve, this great fleet includes many of the fastest passenger-cargo liners afloat—a freight service unsurpassed for speed, safety and careful handling of goods.

The combination passenger-cargo services include the swift, modern ships of the American Oriental Mail Line, which make the fastest time between the United States and the Orient; the Oregon Oriental Line, and the fine vessels of the Pacific-Australia and American Far East Lines.

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UNITED STATES SHIPPING BOARD

TRAFFIC DEPT. - WASHINGTON, D. C.

Pacific Marine Review

The National Magazine of Shipping

MAY, 1926

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Both while dredging and while running free, the control of the main generators and motors is remarkably quick-acting and accurate, and large reserve power is always ready for any contingency.

Each of these four dredges is equipped with three 1000-b.hp. main and two 225-b.hp. auxiliary.

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McINTOSH & SEYMOUR CORPORATION, Auburn, N. Y.

Official Organ

Official Organ
SHIPOWNERS' ASSOCIATION

Pacific Marine Review, Vol. 23, No. 5, Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

Why do you read this magazine?

YOU read it because you get from it something that will be useful to you in your business.

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They know that Linde oxygen is the leader in the field. But more than that, they know that for years Linde has been a clearing house of welding information. They know that through Linde they will be kept in touch with new advances in welding technique. They know that Linde service men stand ready to give them advice and help.

The latest addition to Linde service is Procedure Control. Each Procedure Control describes in detail every step necessary to the successful completion of some welding or cutting operation. With the help of a Procedure Control, your own organization can carry on that intricate job.

THE WELDING of sheet metals has advanced so rapidly and has been successful in so many industries that it became necessary to work out many new methods. Such metals as sheet aluminum and sheet monel, in addition to different thicknesses of sheet steel, required modifications of welding technique. Linde Procedure Controls on these subjects make available to Linde customers the most efficient methods of welding sheet metals and assure them of uniform and consistent results.

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37 PLANTS . 95 WAREHOUSES

LINDE OXYGEN

Pacific Marine Review

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TRULY, Brunswick-Kroeschell is "THE STANDARD FOR ALL MARINE INSTALLATIONS."

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he didn't know it was running

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At the Motor Boat Show in New York a visitor at our booth tried to examine the coupling of an AMF Rotary Pump while it was revolving at top speed. Only the quickness of our attendant saved his fingers from a severe burning.

That pump was so quiet, the visitor didn't know it was running. It was so free from vibration that although it ran continuously for the entire week of the show, it was never even bolted down.

Quiet, vibrationless pumps are a great comfort aboard ship. They mean extra sleep for crew and passengers, and extra life for the pump. AMF Rotary Pumps are not only efficient for removing bilge water and washing decks and anchors, but are effective units of fire fighting apparatus and of lubricating and fuel oil equipment.

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Brooklyn, N.Y., U.S.A.

MAY 1926

Vol. XXIII. No. 5

Pacific Marine Review

The National Magazine of Shipping

Official Organ
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Official Organ
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James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S. Hines. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Federal Aid for Shipbuilders

ON March 24 last, Senator Pepper of Pennsylvania introduced in the Senate of the United States a bill numbered S.3681. This measure is the result of many conferences of shipbuilders, law makers, and cabinet officials. Its object is "to upbuild the American merchant marine in foreign trade and to insure the replacement of the vessels now in use."

The bill provides that any vessel of over 1000 gross tons hereafter built in an American shipyard for an American owner and designed for foreign trade shall, if constructed according to plans and specifications approved by the United States Shipping Board, and if contracted at fair value for sale to the government for war use, and if maintained in highest class of American Bureau, and if kept in foreign trade, be entitled to a refund of the amount of tariff that would have been paid on the material and parts entering into the construction of said vessel if such material and parts had been imported in fabricated form. This refund is in no case to exceed thirty per cent of total cost of vessel and is to be in the form of 25-year United States Treasury bonds, bearing 4 per cent interest, transferable, and exempt from all taxation, except estate and inheritance taxes.

Life of a vessel under this act is placed at twenty-five years, and all obligations of owners under the act cease at expiration of this period. Sale or attempted sale to foreign registry forfeits vessel to United States Government. Diversion of vessel to trade other than foreign forfeits vessel.

Revenue for payment of bond interest under this act is charged against operating revenues of the Panama Canal, and sinking fund for retirement of bonds is set aside out of net profits of that "big ditch."

In framing its legislative policy in preparation for this bill, the Atlantic Coast Shipbuilders Association made a careful anaylsis of fourteen basic constructive factors which together make practically 100 per cent of the finished vessel. On an ad valorem cost basis the tariffs on these parts ranged from 15 per cent to 42 per cent, all of them being above 30 per cent, except paint (25 per cent) and deck machinery (15 per cent). It would be possible, therefore, on practically every ship built under this act to show the owner entitled to the full 30 per cent. This 30 per cent, according to the best judgment of American shipbuilders and shipowners, represents the minimum present differential between European and American shipbuilding costs.

This bill is being hailed with great favor by American shipbuilders and their friends. It does not impose on Congress the expenditure of large funds out of the ordinary revenues, but shows a way to collect from the world of shipping and that without increasing present tariffs, a fund for the encouragment of American owners building ships for foreign trade in American shipyards.

*

A New La Follette Bill

SENATOR LA FOLLETTE, the second, has a bill (S.1079) before the Senate Commerce Committee which is calculated, according to its own preamble, "to provide seamen on American vessels with a continuous discharge book and to provide for increased efficiency and discipline." Were the bill in reality designed to do just that, no one, least of all a shipowner, could find any fault with it. The provisions of this act, however, show clearly that it is calculated to give a "Union card" discharge book and to provide for increased efficiency in "Union" control and for increased discipline of shipowners by the "Seamen's Union." The discharge book provided is to be one containing only description, age, nationality, and signature with no photograph or character notations, and all other forms of discharge book are prohibited. All limitations as to pay at ports being demandable are removed.

Seamen on Pacific-American ships are all provided with discharge books of a much more valuable kind at the present time, and the system is working admirably and to the lasting advantage of the men. The executive in charge of this system is Captain Walter J. Peterson. Speaking against this proposed measure before the Senate Commerce Committee on April 14, Captain Peterson said:

"This bill is one of those pieces of proposed legislation that will further embarrass the shipowner, increase the costs of operation, lower the standards of discipline and morality, further confuse the seamen and take away from them certain rights they have enjoyed for many years, and will give nothing of any value in return. The men who build and operate the ships are opposed to this kind of legislation. The seamen as a whole know nothing about this bill and no demands have been made by either the shipowners or the seamen for this kind of legislation. Mr. Furuseth appears on behalf of the International Seamen's Union and states that his organization has a membership of 18,000 men. In the first place his organization is not international in character and if he has 18,000 men he has not that many in good standing if the records of the Baltimore convention can be credited.

"But for the sake of argument let us admit he has 18,000 men; we need about 60,000 seamen to man the vessels of the merchant marine now in operation.

"The shipowner wants to agree with men who may be depended upon, who will work harmoniously and efficiently and help cause marine operations to run smoothly, and that Mr. Furuseth does not appear able to do. He had brought upon us disastrous strikes; he has tried to put us out of business in the courts; now, as in the past, he hopes to have you gentlemen pass legislation that will make it more difficult for us to operate. Any legislation that will increase the costs of operation has his approval, and if he had been preaching that doctrine to aid the foreign maritime nations he could not have done any better.

"He demands to rule or to ruin; he wants us once more to bend the knee to him in abject humility and take his orders; but, as he himself has stated, a burnt child avoids the fire, and we have been burned too many times to trust to his leadership again. We therefore decline any short splices with Furuseth on one end of the rope.

"Our nation needs the ships of the merchant marine both for peace and war and also to carry out our well defined national policy in relation to them. Help us pass laws that will aid and encourage that policy as well as keep us in harmony with other nations who in times of peace need our products and we need theirs."

Dollar Gets the Ships

THE Dollar Steamship Company's bid for the five "535's" forming the Admiral-Oriental Mail Line has been accepted and, unless some unforseen contingency arises, these steamers will be turned over to the San Francisco firm as fast as their present voyages are completed.

The price paid for the ships, although only a fraction of their cost to the government or their present replacement cost, is all that the ships are worth on the present world market. This apparent paradox arises from two causes. First, the ships under Shipping Board methods cost more than they should. Second, no one seeking first-class passenger liners today would replace these ships with vessels built to the same design. They are first class so far as passenger comfort goes; but they are not among the best designed ships from the commercial owner's point of view. Hence that individual must get them at a low price in order to be able to run them at a profit. The Shipping Board, having experienced this with these vessels, was sensibly willing to sell at a low figure. There can be no justifiable criticism on the price.

Much opposition has been raised in the Senate by Senator Jones of Washington on the ground that the sale agreement gives the Dollar Steamship Company too much leeway in disposition of these ships among its own services. Jones and many of the commercial interests of Seattle would like to tie these ships definitely to the Puget Sound-Oriental run. There is no doubt in anybody's mind that Robert Dollar will keep these vessels on the northern run if the freight and passengers can be obtained there to fill their holds and staterooms. The politicians and some of the business men of Seattle would have the government keep these ships on this route whether they run empty or full. Such men are now using every avenue of approach to the Shipping Board in their efforts to block the sale.

In the meantime our "foremost American shipping man" is quietly going about his work of making business connections throughout the world, collecting and distributing, buying and selling all kinds and classes of merchandise from the four corners and the seven seas to the advantage of American foreign trade and the American merchant marine.

Strong combinations of foreign ships and foreign capital are uniting to capture the carrying of Pacific Ocean commerce, and we are glad that a strong combination of American ships and American "Dollars" are ready to meet this keen competition.

Columbia River Bridge

SENATOR JONES of Washington is, for reasons above noted, the chief opponent to the sale of the American-Oriental Mail Line ships to the Dollar interests. The same gentleman is chief proponent of a bridge over the Columbia River from Longview, Washington, to St. Helens, Oregon. This bridge is bitterly opposed by the Chamber of Commerce and shipping men of Portland, Oregon, because it would be an obstruction to navigation between Portland and the sea. Certainly the senator ought to be able to see this bridge from Portland's point of view.

Japanese Port and Harbor Association

FOR fifteen years the ports of the United States have enjoyed a considerable degree of helpful cooperation and profitable reaction in their American Association of Port Authorities. Local associations of ports have been in existence for a much longer period. Now comes Japan taking another lead from Occidental experience, and the Port and Harbor Association of Japan (Nippon Kowan Kyokwai) is formed to study port and harbor policy and improvements and promote friendly relationship and intercourse among those interested.

This association was founded at Dairen, October 12, 1923. In April 1925 it had 3800 members and had perfected an organization of fifteen departments covering the investigation and study of every phase of port and harbor matters. Each of these departments has a managing director, and the personnel of these directors includes some of the the most eminent engineers and educators of Japan. The headquarters are at Tokio in the Engineering Bureau of the Home Department. A fine magazine is being published monthly: "Ports and Harbors of Japan," an ambitious publication in three volumes is published, or on the press; and several very interesting pamphlets have been issued. The association arranged and successfully held a National Port and Harbor Exposition at Otaru in August 1924, and is holding educational meetings at various ports at a rate now exceeding two a week.

This is made possible by the enormous revenue from membership dues, which on a basis of figures in the April issue of "World Ports," would be over $150,000 a year, certainly a remarkable development in so short a time and another illustration of the adaptability of Nippon and the necessity of cooperation on this side of the Pacific to meet Japanese competition.

"Miscellaneous"

TWENTY years ago San Francisco was swept clean by fire following the earthquake of April 18, 1906. Today a cleaner, bigger, better city in every way stands as a monument to the genius and fighting spirit of San Franciscans.

The Chamber of Commerce, in honor of this twentieth anniversary of the rebirth of the city, published a special April edition of its magazine "San Francisco Business." This magazine shows the United States census figures for the industries of San Francisco.

We looked through the detailed list for shipbuilding and ship repairing, and we found "Shipbuilding, Wooden, including repairing" with twelve establishments with a yearly output less than a million dollars in value. No mention made of steel shipbuilding and repairing, which is one of the greatest industries of the port. Inquiring about this, we found that the Chamber of Commerce had simply taken the census figures.

Now the census, for reasons best known to itself, groups a large variety and quantity of industry under the term "Miscellaneous." Fully one-third the total output in value is so classed for 1923 San Francisco industries.

There may be good and sufficient reasons why this is so in the census returns, but what reason can there be for such a condition in a Chamber of Commerce report? "Printing" heads the list with over 200 plants and 31 million total yearly output. "Miscellaneous" foots the list with about the same number of plants and 125 million output. We suspect that many of the outstanding industrial plants of the city have been relegated to this "classification of the lazy mind."

A Wasteful Practice

DIESEL engines built for the Shipping Board are very expensive both in their construction and in their installation. One reason for the high construction cost, undoubtedly, lies in the 30-day nonstop shop run requirement and elaborate program of maneuvering tests. At this stage of marine diesel engineering, with practically one-half of the world's marine power plants under construction specified as diesel, it would seem rather useless to put these prime movers through long shop tests on every job. It is not done in private practice and there is no real reason for doing it in public practice.

Suppose that every builder of a steam vessel were required by the Shipping Board to set up his boilers, engines or turbines, main and auxiliary steam lines, condensers, feed and circulating pumps, radojets, and what not complete in the erecting shop and give the whole outfit a thirty-day nonstop full load test run and maneuvering tests before he was allowed to install it aboard ship. How many steam plants would come through 100 per cent? How much would have to be added to contract price? How many builders would even consider such a proposition?

And yet when you come to think of the number of possible failure points in a steam plant, there is far more reason for such a demand on the steam engine builders than there is in the case of the diesel.

Diesel Education

WITH the completion of the Shipping Board conversion program and the private contracts for conversion and new motorship tonnage, there will be quite a number of berths available for American marine motor engineers. Much interest is therefore being taken in the various courses available.

Among the most practical of these is the University of California Correspondence Course, material for which has been prepared with great care by Assistant Professor Charles F. Gross of the University of California and C. G. Rosen, consulting engineer of San Francisco. This course is open to all. The fee is nominal, barely covering the cost of the text sent out. The course is very comprehensive, giving in fair detail the essential features of all the more prominent marine type diesel engines of Europe and America. The theory of internal combustion engines is thoroughly explained and the text, if properly digested, should give any student a fairly comprehensive working knowledge of diesel marine power plants.

Those interested should communicate with Geo. W. Smithson, chairman, Department of Correspondence Instruction, University of California, Berkeley, California.

Another, and a very important method, of diesel education is the moving picture. Notable among these is the film showing the construction and operation of the Bethlehem 2-cycle, single-acting marine diesel. This film was made with great care and at considerable expense by George A. Richardson of the publicity department of the Bethlehem Steel Company and is being displayed in all the principal cities of America, with an explanatory talk by its author. There are several other films, including manufacture of car wheels, alloy steels, and open hearth steels, being shown on this tour.

The diesel film was shown at the Palace Hotel, San Francisco, recently to a large and enthusiastic audience. Showings were made also in Los Angeles, Portland and Seattle.

The Bethlehem Steel Company is to be congratulated on its public spirited policy in thus assisting the people of the United States to a better knowledge of the diesel engine and the great economies effected by its use.

Our Present Shipping Policy

By Roger G. Lapham,
President, American-Hawaiian Steamship Company.

CAN we criticise the Shipping Board for failing to dispose of its fleet? No. Let's give the Board credit and say they have faced the worst selling market from the standpoint of the shipowner that the world has ever seen. We are going through a worldwide shipping slump. No matter how good a salesman you may be, it is pretty hard to sell a losing proposition, particularly when the losses are a matter of public record. It is clear that, in trying to carry a greater part of our commerce and at the same time dispose of the fleet to private owners, the Board has been charged with a double duty which is in practice impossible of fulfillment.

Would the American exporter or importer suffer today if all Shipping Board services were withdrawn? Would he be deprived of his markets? We doubt it. Such shipowning nations as England, Japan, and the Scandinavian countries have today a large surplus of idle tonnage for which employment is not available.

Undoubtedly the abandonment of our established trade routes would eventually bring about an increase in ocean rates. That will come anyway, and why shouldn't it? Today shipping is not paying its way. The American exporter and importer are deriving a subsidy to the extent of the Shipping Board losses.

Looking at it from a military and naval standpoint, is it reasonable to maintain during times of peace a commercial fleet of war-time strength any more than it is reasonable to maintain during times of peace an army of war-time strength?

We export more than we import; we want to increase our exports; and yet we are shouting from the housetops that our goods must be shipped in American ships and help pay the losses of our government-owned fleet.

The Shipping Board comes in direct contact with the business men of other nations—daily, intimate contact across the conference table on ticklish and intricate trade problems involving foreign relations.

If these relations are to be maintained on an equitable footing, how essential it is that Shipping Board commissioners should be men of statesman caliber! Have they met that qualification? They have not, nor can they be expected to meet it. Appointed on a political and sectional basis, it is the last thing in their minds to treat our shipping problem from the standpoint of international relations.

We can talk friendship all we want at chamber of commerce banquets to visiting foreigners and entertain the crews of visiting battleships, but can that overcome the daily irritating pressure on those foreigners created by the active and direct presence of the American government in world trade?

It is about time to stop, look, and listen, and ask ourselves just where the continued ownership and operation of a government owned fleet is going to lead us.

[Extracts from paper read before the Commonwealth Club of California]

Ship Stores Since Forty-Nine

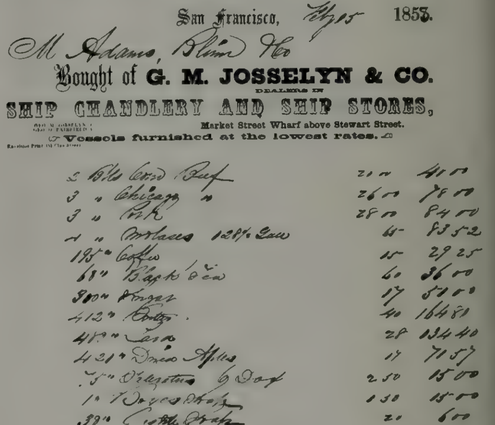
Put on your "specs" and glance down this bill of "sail"—'tis one on display in the spacious window of the firm of Johnson-Joseph & G. M. Josselyn & Co., Inc., San Francisco. An historical and honorable document, truly, penned in 1858,—sixty-eight years ago!

Forty-nine! New Year's eve, a lad named G. M. Josselyn, out from Boston, arrived within the Golden Gate. Our city was young and so was Josselyn. It wasn't long before he was handling freight between San Francisco bay and Sacramento river points.

In 1853, at the south side of Market street, near Steuart, on a wharf, was launched the firm of G. M. Josselyn & Company—Ship Chandlery and Ship Stores. That is the site today of the Southern Pacific building. The boy from Boston served ships of the world until friendly pilots saw him to his final berth in 1908. A son, Charles Josselyn, was associated with the company until 1924, when he, too, passed across the bar.

William Johnson and Samuel Joseph consolidated in 1918 with the Josselyn interests and the name became Johnson-Joseph & G. M. Josselyn & Company, Inc., with headquarters at 56 Sacramento Street, San Francisco. Mr. Joseph and Mr. Johnson had some years before entered the marine supply field and were well-known in marine circles. They are today the managers of the house.

T. A. "Tom" McCord and Martin Newell, two pioneers with the Josselyn regime, are active with the firm. Mr. McCord's record is 44 years; 36 years associated with Mr. Josselyn. Mr. Newell has been on the job for 30 years. Serving the Southern California field is William Chace, manager of the branch at San Pedro. Plymouth rope is one of the high grade lines handled by this house of "J. J. & J."



San Francisco, Feby 15 1853.

M Adams, Blim & Co

Bought of **G. M. JOSSELYN & CO.**
DEALERS IN
SHIP CHANDLERY AND SHIP STORES,
Market Street Wharf above Stewart Street.
Vessels furnished at the lowest rates.

2 Bbls Corned Beef	21 00	41 00
3 " Chicago "	26 00	78 00
3 " Pork	28 00	84 00
4 " Molasses 128½ Gall	65	83 52
195 " Coffee	15	29 25
60" Black Tea	60	36 00
300" Sugar	17	51 00
412" Butter	40	164 80
480" Lard	28	134 40
421" Dried Apples	17	71 57
[illegible] Oysters 6 Doz	2 50	15 00
10 [illegible]	1 50	15 00
30" Castile Soap	20	6 00
6 Doz Allspice	4 00	24 00
6 " Cinnamon	5 00	30 00
6 " Mustard	2 50	15 00
6 " Pepper	2 50	15 00
6 " Ginger	3 50	21 00
60 Gall Cask Pickles	60	36 00
1 Cask Vinegar 59 Galls	75	44 25
50 Bags [illegible]	15	7 50
1 Gross Matches	1 25	5 00
4 Doz Pails	4 50	18 00
319" Tobacco	40	128 [illegible]
Drayage		3 75
		$ 1151 64

The Ocean Bill of Lading

An Analysis of the Conditions Arising from and the Liabilities Attaching to the Various Clauses of the Document

By Norman F. Titus, Manager, Claims-Insurance,
McCormick Steamship Company.

THERE is probably no business more fraught with controversy between owner and customer than the shipping business. The reason for this is that the customer, a shipper, rarely has a complete understanding of the conditions under which his goods are transported. Some shippers adhere, even, to the belief that it is an absolute obligation for the shipowner to deliver goods in the same condition in which they were received or pay for damage. This attitude reveals a lack of knowledge of the bill of lading. As a matter of fact, the bill of lading is strictly a limited liability document, and the trouble in most cases is due to the circumstance that the shipper is absolutely unaware of the legal or contractual exemptions enjoyed by the shipowner.

The bill of lading is one of the fundamental bases of foreign trade; it is the document upon which the banker advances credit. It is, in reality, the instrument which makes foreign trade possible. It is highly important, therefore, that a better understanding should exist concerning the conditions under which goods are transported.

Liability of the Carrier at Common Law is that of an absolute insurer of the goods, and, in the absence of express contract, he is answerable for all loss and damage occurring while in his hands as carrier, excepting those arising from Acts of God and Acts of Public Enemies; and these exceptions do not avail him if the loss has been caused by his negligence, deliberate fault, or unfitness or unseaworthiness of the vessel.

Actual Conditions of Transit: As a matter of established practice, the shipowner's liability for goods transported is quite different from that imposed by the common law due to legislative modifications of his common law liability, and also due to the fact that he habitually introduces into his bill of lading certain legally permissible exemptions. Shipowners, generally, in their bills of lading, refer to these legislative modifications. In any event, however, the shipowner's liability is governed by the expressed terms of the bill of lading and also by implied terms written into the bill of lading by statute law, and the recognized customs of the trade. In general, the expressed and implied conditions affecting the transportation of goods are as follows:

Harter Act. The most important legislative act affecting the relations of shipper and carrier is the Harter act passed by Congress February 13, 1893. This act, while exempting a shipowner, who has exercised due diligence to make his ship seaworthy, from liability for damage or loss resulting from what may be described briefly as navigation risks, prohibits him from inserting in any bill of lading or shipping document any clause relieving him from liability for what may be termed carriers' risks. Another way of expressing this is to say that the general purpose of the Harter Act is to make the vessel liable for faults in connection with the ordinary shipment and stowage of the cargo, but to exempt her from liability for faults or errors in navigation after the voyage commences. The line of distinction between acts connected with handling the cargo and those connected with handling the ship is very closely drawn and has caused many decisions which seem to be apparently inconsistent.

There is nothing in the Harter Act to prevent a carrier from stipulating against miscellaneous causes of damage arising in the course of transportation; but the effect of the Harter Act is to hold the shipowner liable where there has been any failure in the care and custody of the cargo, or failure to use due diligence to make the vessel seaworthy. The advantage to the shipowner of permitting the insertion of these stipulations in the contract of carriage is that they shift to the cargo owner the burden of proof of establishing the fault of the vessel. However, the burden of establishing due diligence to make his vessel seaworthy properly rests on the ship owner.

Attachment of the Harter Act: The shipowner may not claim the exemptions of the Act for losses and damages caused by error in management until after the vessel has actually sailed. The fact that the vessel may be fully loaded and ready to sail does not make the act applicable. Furthermore, the exemptions of the Harter Act apply until the cargo is discharged from the vessel.

When Carrier's Liability Attaches: The responsibility of a common carrier for goods intrusted to him commences when there has been a complete delivery to him for the purpose of immediate transportation, and whether a bill of lading has been issued or not, the maritime agreement has commenced.

When Title to Goods Passes: In the case of goods transported under a straight bill of lading, title to the goods passes to the consignee the moment the bill of lading is signed by the carrier's agent. With the order bill of lading title is vested in the possessor of the document after it has been endorsed by the party to whose order it was issued and all the subsequent transferees.

Seaworthiness: The most important warranty on the part of the owner is that the vessel is seaworthy. Section 2 of the Harter Act apparently obligates the shipowner to furnish an absolutely seaworthy vessel; however, the courts have held that the warranty of absolute seaworthiness is unjust, for the reason that the vessel might, for instance, be seaworthy for the coal or lumber trades and still not be seaworthy for the business of carrying sugar or nitrates.

Thus it is that the decisions of the United States Supreme Court permit the owner to reduce the absolute warranty of seaworthiness by stipulating in the bill of lading for an exemption from liability if he has used due diligence to make the vessel seaworthy at the commencement of the voyage. Furthermore, as a corollary of this authority, the shipowner may contract against loss and damage arising from latent defect in hull or machinery existing when the voyage commenced, but not discoverable by due diligence.

Concerning the question of seaworthiness, we find the following:

a—If a vessel sinks in calm weather, or in weather which is customarily expected on the voyage, she is presumably unseaworthy.

b—Docking once a year and proof of a thorough examination at that time are generally sufficient to establish a presumption of seaworthiness.

c—The burden of proof in establishing diligence to make the vessel seaworthy is upon the shipowner.

d—A vessel may be seaworthy as to navigation but unseaworthy as to cargo. Also, a ship may be seaworthy as to one part of a cargo and unseaworthy as to another.

In the following cases vessels were held unseaworthy for the reasons stated:—leaky chain lockers; leaky hatches and decks, where the defect should have been discovered and which developed from ordinary weather during the voyage; improper repairs to the locker of the vessel containing the ship's stores, which permitted oil to drop on the cargo, (the defect in this case was noticeable merely on a casual inspection); the failure on the part of the shipowner during the time the vessel was in drydock to properly screen the intake pipes, thus permitting foreign matter to prevent closing the ship's valves.

It will be noticed that each of the foregoing situations might have been avoided by proper repairs prior to the actual departure of the vessel.

A competent master and an adequate complement of officers and crew are extremely important in determining whether the vessel was seaworthy at the time of her departure. However, a negligent act of the master is not necessarily proof of his incompetency sufficient to form the basis of a presumption of unseaworthiness.

In this connection, many fine distinctions have been made in the case of refrigerating apparatus on modern vessels. If the apparatus was defective, or its condition might have been ascertained by due diligence, it is evidence of unseaworthiness and the owner is liable. However, if, on the other hand, the apparatus was sufficient, but was carelessly used, that is a fault in navigation and the owner is protected and exempt under the Harter Act.

Faults or Errors in Navigation or Management of the Vessel: Section 3 of the Harter Act includes exemption for many things, but principally for faults or errors in navigation or in management of the vessel.

The navigation and management of a vessel, within the meaning of Section 3 of the Act, includes the determination of the time and manner of leaving port; this is the prerogative of the master. It is a fault in navigation if the master fails to ascertain and heed the warning of the Weather Bureau before starting on a voyage.

The following decisions give some idea of the judicial decisions which excuse the vessel and her owners for damages arising out of "errors in navigation or management." A vessel, seaworthy at the commencement of the voyage, was seriously damaged by heavy weather, the captain continued the voyage and in doing so passed by a port where proper repairs might have been effected. Notwithstanding additional sea water damage occasioned after passing this port, the vessel was relieved from responsibility. The same conclusion was stated in a case where a vessel put into a port of distress and only temporary repairs were made, although the captain had an opportunity to arrange for permanent repairs for damage resulting from heavy weather; again the ship and her owners were excused when the vessel arrived at her destination, and prior to the discharge of any part of her cargo she was "tipped by the head" for the purpose of permitting an examination of her propeller, and owing to a broken pipe sea water from the No. 1 ballast tank damaged cargo. Neglect by the ship's officers to use the pumps in discharging excessive bilge water was excused where the failure was caused by the death of the engineer. This rule concerning the ship's pumps was also recognized in a case where the crew were unable to start the pumps owing to the extreme danger from seas which were breaking over the decks. A stranding resulting from the negligence of a pilot and the misunderstanding of lighthouse warnings was held to be "an error in navigation and management" which relieved the vessel from the responsibility for damaged cargo.

A problem frequently presented concerning "error in navigation and management" arises from the improper handling of the ship's valves, permitting steam or water to damage cargo. Assuming the vessel to have been seaworthy at the commencement of the voyage, if the valve is opened while the vessel is at sea, the rule of "error in navigation and management" will exonerate the owner.

A recent case is interesting in this respect concerning the vessel owner's liability for damage to cargo resulting from the improper opening of a steam valve. The vessel was completely loaded and was waiting until her mooring lines had been cast off the wharf so that she might proceed to sea. At this time the engineer accidently opened a steam valve, which damaged cargo. The court held this action by the engineer was not "an error in navigation or management" in accordance with the terms of the Harter Act. The vessel was held liable on the ground that at the time the vessel sailed from the dock the cargo was being damaged by steam as the result of the engineer's improper action. In this respect the vessel was held to be unseaworthy at the time she sailed and "not reasonably fit to carry the cargo she had undertaken to transport."

It is practically impossible to enumerate all the situations which are likely to cause injury to cargo during the voyage. The definition of the words "navigation and management" of a vessel within the meaning of the Harter Act has been held to "include the control during the voyage of everything with which the vessel is equipped for the purpose of protecting her and her cargo against inroad by the seas."

Probably the best idea relative to the fine distinction between liability in care and custody of cargo and exemption for errors in management and navigation can be gained from the following cases with reference to the management of portholes on two different steamers. In the case of the Silvia, an inside iron shutter to a port in a compartment having very little cargo and easily accessible, but which should have been closed in stormy weather, was knowingly left open by the ship's officers before sailing. It could have been easily closed. The porthole, itself, was without defect; the vessel encountered a storm at sea and the crew forgot to close it, with the result that some of the goods were damaged. The court held that the vessel was seaworthy on sailing, and the damage from seawater, which came in through the broken port, resulted from a "fault or error in the management of the vessel." Consequently, there was no liability on the part of the owner. On the other hand, in the case of the Manitoba, a porthole was unintentionally left insecure at the time of sailing. The court held that this was a fault connected with the ordinary loading and was not an act of navigation; therefore, the owner was liable.

Perils of the Sea: Almost every contract in respect of employment of the ship contains an express or implied exception of perils of the sea. This provides an exemption of liability on account of losses caused by these perils. Tempests, rocks, shoals, icebergs, and other obstacles are within the expression; so are incursions of sea water during heavy weather which damage the goods, as well as such bad weather as prevents ordinary ventilation and causes the cargo to heat and sweat. When the peril is the proximate, or nearest, cause of the loss, the shipowner is excused.

Fire: Under Section 4282, Revised Statutes, the owner is not liable for fire on shipboard, unless such fire is caused by his design or neglect. The owner of the vessel is not deprived of the benefit of this Act by reason of the misconduct of the officers or sailors on the vessel unless he personally participates in the destructive act. In addition to this, practically every bill of lading carries a clause exempting the shipowner for fire on shore.

Deviation: Practically all bills of lading contain elaborate exceptions purporting to give the vessel the privilege of deviating and calling at ports out of their order, etc. These clauses, however, are very strictly construed by the courts against the shipowner. The facts are that the law requires that the ship must cover the proposed voyage without deviation; that is, there must not be a voluntary departure, without necessity or reasonable cause, from the regular and usual course of a voyage. The master may deviate, however, under certain conditions; for instance, when forced to do so by stress of weather, for the safety of vessel, crew, or cargo, or to save life. The decisions against the carriers have been so strict that, at present, unreasonable or unexcused delay in starting a voyage has come to be ruled as a deviation. The shortness of time or distance of deviation is immaterial, if voluntary and without necessity, and not justified by custom. The vessel may make only "reasonable deviation;" that is, she may call at a port lying directly on the route of her voyage, but she may not go out of her way to any considerable degree. If she does do so, and the shipper is damaged in any way, no exception in the bill of lading will avail. In some cases owners have escaped liability by presenting strong, affirmative proof that the deviation was a well established custom of the trade. In case of deviation, the vessel becomes a full insurer of the goods and responsible to the cargo owner for the safe arrival of the goods, irrespective of any limitation in the bill of lading notwithstanding.

General Statutory Exceptions: In addition to other relief in the Harter Act, Section 3 gives the shipowner exemption from the liability for damage from these further causes:

a—Perils of the sea, or other navigable waters,
b—Acts of God,
c—Acts of public enemies,
d—Inherent defect, quality, or vice of the thing carried,
e—Insufficiency of package,
f—Seizure under legal process,
g—Loss from any act or omission of shipper,
h—Saving, or attempting to save, life or property at sea.

Restraint of Princes: The bill of lading usually contains a provision exempting the shipowner from liability for damage due to "restraint of princes." This quaint phrase means any kind of governmental action which interrupts the voyage or otherwise prevents the performance of the contract. These restraints occur most often during war, although they may happen in time of peace, as in case of detention in quarantine.

Valuation Clauses or Limitation of Liability: Although the Harter Act purports to render it illegal for shipowners to contract out of their liability for loss of, or damage to, goods; nevertheless, the courts have held that it was permissible for a carrier of goods to agree with a shipper upon the valuation of the property carried; so that the carrier assumes liability only to the extent of the agreed valuation. This clause in most bills of lading limits liability to invoice value, but not to exceed $100 on each package. In many bills of lading in the foreign trade the limit is $250 per package.

The Jason Clause: As a result of an adverse decision in the case of the Irrawady, a clause was introduced into bills of lading providing that in cases of general average resulting from faults or errors in navigation or from failure to make the ship seaworthy, providing due diligence had been used, the cargo owners should contribute in general average with the shipowner. In the case of the Jason, cargo owners for eight years contested the validity of this clause in the bill of lading. The Supreme Court found the clause valid, and it now appears in practically all bills of lading and is universally known as the "Jason Clause." The effect of this clause is to permit the collection of general average contributions from the cargo owners, although the accident causing general average charges may have been caused by negligence in navigation.

When Freight is Earned: In the absence of a stipulation in the contract of carriage, freight is earned when goods have been carried to destination. If the bill of lading provides that prepaid or guaranteed freight is earned vessel or goods lost or not lost at any stage of the transit, the provision is legally binding.

Duration of Carrier's Liability: The carrier's liability ends when he gives notice of arrival of goods and has afforded consignee reasonable time to remove them. Some bills of lading stipulate that liability ends at ship's tackle.

General Exceptions Clause: Probably the most lengthy clause in bills of lading is that known as the "General Exceptions Clause." This contains a long list of exceptions protecting the carrier from such things as damage due to breakage, leakage, heat, rust, sweat, vermin, etc. Exceptions such as these prevail provided the carrier is free from negligence. Where these exceptions are found in the bill of lading the cargo owner has the burden of proving that the carrier's negligence caused the damage.

Notice of Claim or Filing of Suit: Bills of lading contain provisions to the effect that the carrier is not liable unless notice of claim be filed within a certain time or that suit, if any, be filed within a certain limit. These exemptions are legal.

Weight, Quantity, Quality, etc.: Bills of lading generally contain a clause stating that weight, quantity, quality or condition of shipment is unknown to the carrier and any such statements relative thereto in the bill of lading are not binding upon the carrier. What this means is that the carrier only obligates itself to transport so many packages, and if delivery is made in specie, i. e., in the containers received, its obligation is discharged. For instance, if one thousand bags of coffee were received and delivered intact, the carrier would not be responsible for difference between the weight given in the bill of lading and the actual weight at the point of delivery.

Released Valuation Clause: Frequently bills of lading are issued for the carriage of certain commodities, as for instance, furniture, plumbers' earthenware, household goods, under a released valuation—a familiar example being the agreed value of ten cents per pound. In such cases the carrier's liability would be limited to an amount based on the weight of the article damaged. In case of salvage claimant would get benefit of same, and the theory would be to make claimant whole, up to the limit of liability, whether loss was partial or otherwise. Under a valuation clause, therefore, it is reasonable that the carrier need not make any payment where damaged article delivered is still worth as much as the agreed total valuation stated in the bill of lading.

Pilferage or Theft: Pilferage is stealing by stealth; theft is stealing by force; in either case a general exemption in the bill of lading relieving the carrier from liability is valid. However, these provisions do not afford protection in a case where there was negligence on the part of the ship which contributed to the theft or facilitated it. To prove that the act took place on shipboard, it would be necessary to have evidence of a broken package subsequent to delivery to the vessel. If the package were delivered intact, without external marks of violence, there would be an absence of evidence to support accusations of pilferage or theft aboard ship.

Subrogation of Insurance: Shipowners generally introduce in their bills of lading a clause providing that in case of loss payments they are to be entitled to any benefits of insurance possessed by claimant, whether payment be direct, by loan receipt, or otherwise.

Voyage Obstructed: Lengthy clauses appear in bills of lading giving the carrier the privilege of reforwarding by other means of transportation, lighter, etc., in case the voyage is obstructed by means beyond its control; for instance, tidal waves, ice blockades, and quarantines. It is generally stipulated that the cost in such cases is to be paid by cargo owner.

Time and Delivery: Bills of lading usually provide that the vessel owner makes no guarantee of a definite time of delivery; that is, he does not agree to meet any particular market on any particular date. Whether the delivery has been unduly prolonged is a question of fact depending on varying circumstances.

Bill of Lading Issued for More Goods Than Taken Aboard: As regards tally, the bill of lading is merely a receipt and, like any other receipt, is subject to explanation. Legally, of course, the shipowner must prove his case by a preponderance of evidence. Another phase of this is the legal point that if a master signs for goods not taken aboard he has exceeded a master's authority and the bill of lading has no binding force on this point.

Liability for Valuables Undeclared: Under the Revised Statutes of the United States the shipowner is not liable in any manner for valuables where the shipper fails to honesty disclose the contents of the package.

Inflammable, Explosive, or Dangerous Cargo: According to the Criminal Code, the shipper of inflammable, explosive, or dangerous cargo renders himself liable to a criminal prosecution if he fails to properly pack the shipment and notify the carrier of its contents.

Miscellaneous Clauses: In addition to the foregoing, most bills of lading have clauses covering the following which do not require special explanation:

They provide that in cases involving two or more carriers, carrier's liability is several, not joint; that is, each pays only for damage on its line.

The shipowner, or his agents, issues bills of lading to cover the carriage by sea; if goods are transferred to land carrier, then the railroad carrier's bills of lading apply unless there is a contractual obligation which makes the railroad company the agent of the shipowner for a through carriage to point of destination. The usual situation, however, is that the rail and water carriers issue bills of lading for their respective hauls.

Carrier has a lien against the shipment for all fines caused by shipper's negligence in Custom House matters, etc.

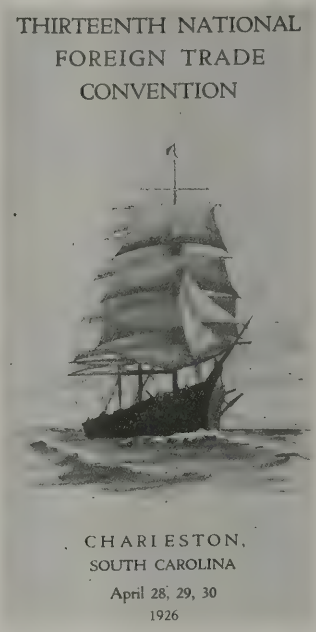
Harbor tolls are to be paid by owner of goods, etc.

Cargo on Deck: Absence of agreement with shipper permitting carriage of goods on deck, obligates the carrier to stow goods under deck. The words "on deck at owner's risk" do not relieve carrier from all causes whatsoever, but he is held to reasonable care and custody such as any prudent man would give property entrusted to his care and which is to be carried in the agreed manner.

Conclusion: The enormous mass of fine print in the bill of lading fairly baffles the shipper, and his greatest present consolation lies in the fact that at the Brussels Conference of October, 1922, the representatives of twenty-four nations agreed to standardize and liberalize the bill of lading. Great Britain carried out this protocol by passing the Carriage of Goods By Sea Act of 1924; other nations will, unquestionably, follow suit. There seems to be some relief in sight for the poor, bewildered and harassed shipper encompassed by a maze of technicalities.

Trade and Traffic Trends

Charleston Hostess to Foreign Traders



THIRTEENTH NATIONAL
FOREIGN TRADE
CONVENTION

CHARLESTON,
SOUTH CAROLINA
April 28, 29, 30
1926

TOPICS of foreign trade policy and practice affecting every section of the United States were discussed during the 1926 National Foreign Trade Convention, held at Charleston, South Carolina, April 28, 29, and 30, by speakers of nation-wide prominence in business affairs. James A. Farrell, chairman of the National Foreign Trade Council, opened the convention with an address on "The Foreign Trade Outlook." The gathering brought together 1500 foreign trade executives from more than thirty states and was the first large convention of the kind ever held on the South Atlantic Coast.

An outstanding event of the occasion was an address by Henry M. Robinson, president of the First National Bank of Los Angeles, on "The European Situation of 1926," delivered in the second general session, April 29. It is a noteworthy tribute to foreign traders that an outstanding authority like Mr. Robinson should travel 3000 miles to make an address at this gathering.

The foreign traders also heard from C. C. Martin, credit manager, National Paper & Type Co., New York, what foreign business men have been saying for the past few years about the concrete effects of American competition abroad. Mr. Martin's address on "Making American Competition Effective" was the closing speech of the convention. Other important addresses on themes of widespread public interest included "The Import Element of Our Foreign Trade," a frank discussion of sources of supply for American manufacturers, by Fred I. Kent, vice-president, Bankers Trust Company, New York; "Building Trade Through Foreign Loans," by Paul J. Kruesi, president, Southern Ferro Alloys Company, Chattanooga; "The Problem of the Far East," by Dr. Jeremiah W. Jenks, former adviser to the government of China; and "Communications—The Electric Nerves of Trade," delivered by John L. Merrill, president, All American Cables Company. Mr. Merrill also spoke at a luncheon under the auspices of the American Manufacturers Export Association.

The southern manufacturers and export interests were of course strongly represented at the convention.

Among the papers from this group were: "Commercial Possibilities of the South Atlantic," by R. Goodwyn Rhett, president of the Peoples-First National Bank of Charleston and former president of the United States Chamber of Commerce; "The South's Part in American Exports," by George G. Crawford, president, Tennessee Coal, Iron and Railroad Company, Birmingham; "Economic Resources of the South Atlantic," by Dr. Erich W. Zimmerman, Professor of Commerce, University of North Carolina; "Inland Rate Structure of Southeast," by Thomas J. Burke, traffic commissioner of Charleston; and discussion on the problems of cotton in American foreign trade by leading cotton authorities.

Group sessions were held with the cooperation of the American Manufacturers Export Association, the Export Managers Club of New York, the National Association of Credit Men, and the foreign trade sections of national advertising and bankers associations.

A permanent roster of trade advisers representing every phase of national industries, trade technique, and foreign market information in the field of foreign trade was a new feature of this year's convention.

In connection with the convention, the city of Charleston organized military demonstrations at Fort Moultrie in Charleston Harbor, celebrating the first victory of the Revolution in the South, won six days before the Declaration of Independence.

The Chamber of Commerce of Charleston was founded in 1773. This city at that time, and for many years thereafter, enjoyed a culture in letters, art, and architecture equal to that of Boston and Cambridge. For nearly sixty years after the Civil War Charleston slept, and large sections of the city remain to day absolutely unchanged. "A lingering fragrance" of the charm of a past age here combines with modern waterfront improvements and up-to-date manufacturing establishments worthy of note by all foreign traders, all shippers, and ship operators. Since 1921 Charleston has been rapidly forging ahead as a Southern Atlantic Coast port and has been actively bidding for overseas freight originating in points widely scattered over the southeast and the middle west portions of the United States. With this background and this energy she was able to show the National Foreign Trade Council a very interesting and educational exhibit.

By common consent of the delegates, the convention program was declared the best ever organized by the National Foreign Trade Council. This was the thirteenth convention the National Foreign Trade Council has held at different American cities since its foundation in 1914.

Passenger Ships as Cargo Carriers

An Analysis of the Influence of the Developments in Shipbuilding on the Growth of the Steamship Liner Trade

By E. T. Chamberlain, United States Department of Commerce.

DURING the past thirty-five years steel became almost the sole material for the hulls of ships. Besides increasing directly the size of ships, it has added to their carrying capacity in two ways not usually disclosed by gross and net tonnage figures.

Shelter Deck Structures Augment Cargo Capacity.

Some cargo has always been carried, as a rule, on the decks of ships, but the use of steel made possible structures to shelter cargo thus carried. Unless these structures are "permanently closed in" they are not included in the gross or net tonnage of ships under the laws of maritime nations or in the entry or clearance returns of ships' net tonnage, although they increase materially the cargo-carrying power.

Double Bottoms Increase Carrying Power.

Steel has extended the construction of double bottoms, primarily for safety, but also for water ballast and for fresh-water supplies for boilers, passengers, and crew. Double bottoms are not included in the gross or net tonnage figures of ships. The more recent use of oil as fuel and the growing construction of motorships have given the double bottom even greater value as a receptacle for oil, either as ships' fuel or as cargo, thus saving for cargo the hull space formerly needed for bunker coal as well as adding directly to cargo space.

Board of Trade Allowance for Machinery and Bunkers.

While the hull space occupied by bunker coal was not included in ships' net tonnage, the British Board of Trade rule (generally adopted by the United States and other maritime nations), in the case of most ocean steamers of moderate or slow speeds, permits the subtraction of 32 per cent of the ship's total closed-in space as an allowance for machinery and bunkers. This percentage, as a rule, allows considerably more space for bunker coal than is actually used for the purpose; consequently, in the case of oil-burning ships carrying the fuel in double bottoms and also enjoying the benefits of the Board of Trade rule, the cargo carrying capacity is much beyond that indicated by ships' net tonnage.

The Board of Trade rule may have reflected conditions when adopted seventy years ago, but machinery improvements and more thorough coal consumption have changed those conditions, while the construction of shelter decks and double bottoms and the use of fuel oil since the world war have steadily increased the carrying capacity of ships over that indicated by their net tonnage. Hence, in any computation of the capacity of transoceanic transportation or of its distribution among passenger ships, cargo liners, tankers, and general traders or tramps, there should be taken into account the double bottoms used for oil and the sheltered deck spaces with their implications, though not clearly disclosed by government returns.

Carrying Capacity from Canal Returns—Suez.

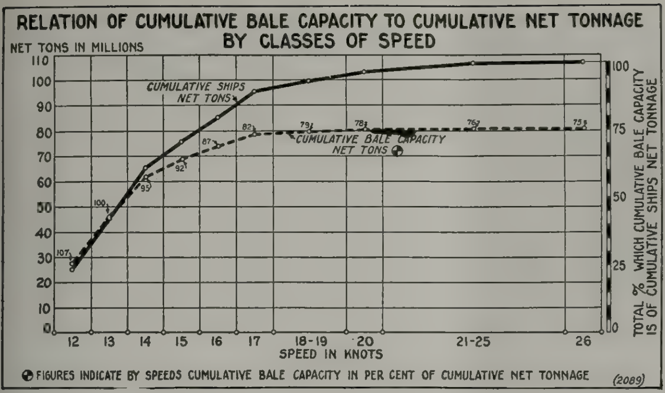
Fortunately, the transit returns through the Suez and Panama Canals, the principal routes of interocean navigation, are based on the carrying capacity of ships in which the steel double bottoms and structures to shelter deck cargo are included, and in which coal bunker spaces, under the Danube rule, are more accurately computed. The Suez Canal rules provide that shelter-deck spaces, when once employed to carry cargo, passengers, or fuel, shall always thereafter be included for canal dues in ships' net tonnage; and double bottoms, whenever used for oil, shall be taxable. The Panama Canal measurement rules are substantially the same as the Suez Canal rules.

The 4300 ship transits through the Suez Canal in 1922 totalled 20,743,000 Suez net tons (of 100 cubic feet each), or an average of 4800 Suez net tons per ship; while substantially the same ships, in the Egyptian Government returns based on net tonnage of the ships' national register, averaged 4000 net tons. It is clear, therefore, that the shelter decks, double bottoms with oil, and more exact bunker coal allowances added 800 tons, or 20 per cent, to the carrying ca-

Speed and actual cargo power in relation to ships carrying passengers

Speed, in knots	Ships								Carrying capacity [1]					
	Total number		Oil-fuel		Shelter-deck		Both oil-fuel and shelter-deck		Ship's net tons		Bale capacity		Bale per cent of ship's net tons	
	Actual	Cumulative	Actual	Cumulative	Actual	Cumulative	Actual	Cumulative	Actual	Cumulative	Actual	Cumulative	Actual	Cumulative
12	505	505	191	191	187	187	73	78	25,200	25,200	27,024	27,024	107	107
13	330	835	92	[illegible]	93	280	25	98	20,358	45,558	18,967	45,991	93	100
14	265	1,100	73	356	100	380	27	125	19,656	65,214	15,652	61,643	80	[illegible]
15	120	1,220	50	406	49	429	27	152	10,440	75,654	7,230	68,873	69	92
16	94	1,314	31	437	29	458	18	170	9,344	84,998	5,056	73,929	54	87
17	77	1,391	40	477	36	[illegible]	26	196	10,387	95,385	4,505	78,434	43	[illegible]
18–19	29	1,420	8	485	18	507	[illegible]	202	4,194	99,579	1,250	79,684	30	79
20	15	1,435	8	493	8	515	3	205	3,200	102,779	640	80,324	20	[illegible]
21–25	10	1,445	7	500	4	519	4	209	3,830	106,609	254	80,578	7	76
26	1	1,446	1	501	1	520	1	210	310	106,919	16	80,594	5	75
Total	1,446	....	501	....	520	....	210	....	106,919	....	80,594	....	75	....

[1] In thousand net tons (each of 100 cubic feet), multiplied by speed.



⊕ FIGURES INDICATE BY SPEEDS CUMULATIVE BALE CAPACITY IN PER CENT OF CUMULATIVE NET TONNAGE (2089)

pacity of the average ship in transit. In 1924 the Suez transits numbered 5100 of 25,110,000 Suez tons, or an average of 4900 Suez net tons.

Panama and Suez Canal Returns Compared.

The 5200 ship transits through the Panama Canal in the fiscal year of 1924 totaled 26,150,000 Panama net tons, or an average of 5000 net tons per ship; while the total by ships' register was 20,960,000 net tons, or an average of 4000 net tons. The Panama rules thus increased by 1000 net tons, or 25 per cent, the carrying capacity of the average ship above that shown by the ships' national register.

Of the Suez transits, however, 3,450,000 tons were mail steamers, mostly coal burners usually of 16 knots or more, which are less affected by considerations already mentioned than are the slower liners, whereas the mail steamers through the Panama Canal are confined to those to the west coast of South America and a few to New Zealand. On the other hand, 37 per cent of the transit tonnage through the Panama Canal consisted of oil tankers, and oil burners comprise the majority of the transits. The development of the Mosul oil fields under British mandate is giving and will give added importance to double bottoms in Suez Canal traffic and tolls.

These 9500 transits (both ways) through the Suez and Panama Canals show canal measurements of 46,900,000 net tons and ships' register measurements of 38,160,000, net tons, or, through more exact allowances for bunker coal, oil fuel, double bottoms, and shelter decks, an addition of 23 per cent in carrying power to that set forth in ships' registers.

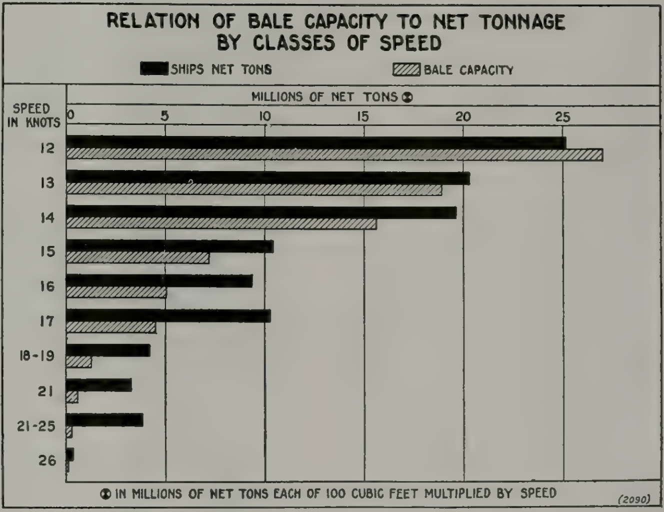
Cargo Space on Passenger Liners.

The transport of transoceanic and interoceanic passengers is confined mainly to ships of 5000 gross tons or more and of 12 knots speed or over. These ships number 1446, of 12,593,000 gross tons and 7,534,000 net tons (after minor corrections in the table in Commerce Reports for January 11, 1926, p. 97), and, when speed is considered, they afford space for about 47 per cent of the transoceanic and interoceanic transport of both passengers and cargo.

The greater part of this space is devoted to cargo. These ships carry not only most of the manufactured goods and miscellaneous cargoes, but also a considerable part of the bulk cargoes. The amount of bales they have space for is a fair measure of their cargo capacity. The bale capacity, in ship tons of 100 cubic feet for a great number of ships, is stated in Lloyd's Register for 1925-26. For the 1446 liners considered in the following table it has been compiled or estimated ship by ship. Where the bale capacity is not given in Lloyd's Register it has been approximated by comparison with the bale capacity assigned by the owner to similar ships of the same or other corporations in the same or similar trades.

Exceptional Passenger Ships.

The fastest ships, of course, devote the most space to passengers and the least to cargo. The steamship Mauretania of 26 knots speed, at the head of the list, is 12,500 net tons, of which only 650 net tons, or 5 per cent, represent bale capacity. In the remaining 11,850 net tons there have been transported 978 third-cabin and 753 first and second-cabin passengers —in all, 1731 passengers, or an average of a little less than 7 net tons (700 cubic feet) per passenger. The steamship Leviathan devotes to cargo 220 out of 27,700 net tons; the rest is given to passengers, of whom she is certified to carry 3400, thus allowing 8 tons per passenger. These two ships have spacious and elaborate accommodations for first-class passengers and ample steerages. The space on ships carrying both cabin



⊕ IN MILLIONS OF NET TONS EACH OF 100 CUBIC FEET MULTIPLIED BY SPEED (2090) and steerage passengers is usually less, and on the average, with full passenger lists, falls below 600 cubic feet per passenger.

Estimated Proportion of Cargo Carrying Power.

The following table gives particulars, actual and cumulative, based on rates of speed for these 1446 ships, which help to determine their cargo carrying power. A little over one-third of the ships are oil burners, and rather more than one-third are shelter deck ships; while 210 are oil burners with shelter decks. From these, of course, the coal burners of the several types can readily be figured. These details, though basic for specific types and trades, can be used only incidentally in a general review of this kind.

The bale capacity, however, points to cargo carrying power in which the combined effect of shelter decks and double bottoms (if used for cargo or fuel—coal or oil) and bunker coal deductions is indicated, with allowance for speed. The total ships' net tonnage thus computed is 106,919,000 net tons of 100 cubic feet, and the bale capacity is 80,594,000 net tons, or 75 per cent of the total carrying power in ships' net tons. Not all of this bale capacity, however, is included in the ships' net tonnage. Thus the bale capacity of the 505 ships of 12 knots is 107 per cent of their net tonnage, and the bale capacity of the 835 ships of 12 and 13 knots combined is a trifle over their entire net tonnage. Lloyd's returns show that the space available for grain, a bulk cargo, averages about 8 per cent more than for bale or measurement cargo, where the carrying capacity of each is stated. Of course, ships with refrigerated space have been computed, where necessary, in the table.

Liners of 12-14 Knots Show Greatest Bale Capacity.

Ships of 14 knots or under and 12 knots or over number 1100, with a ship net tonnage, multiplied by speed, of 65,214,000 tons and a bale capacity, multiplied by speed, of 61,643,000 tons; 95 per cent of the net tonnage is thus devoted to cargo. The ships of 15 knots or over number 346, with a ship net tonnage, multiplied by speed, of 41,705,000 tons and a bale capacity, multiplied by speed, of only 18,951,000 tons; the remaining 57 per cent, or 22,754,000 net tons, is devoted to passengers. The popular mind is apt to associate the word liner only with the latter group of faster ships. The operation of cargo liners by passenger steamship companies began before the war; the war hastened its growth, and it has been the outstanding feature of the commercial transoceanic transport system during the past few years.

Specific Increases through Shelter Deck Construction.

Thus, 10 shelter deck steamers of 14 knots of the Commonwealth & Dominion Line, the Australian, branch of the Cunard Line services, total 53,000 net register tons; but their bale capacity is 69,000 tons (which is also their Suez tonnage), an increase of 30 per cent above registered tonnage, and their grain capacity is 73,000 tons, an increase of 38 per cent. These ships were built after the world war. The 10 ships of 13 knots, with which the White Star Line conducts its Australian cargo service, total 67,000 net register tons and have a bale capacity of a little over 60,000 tons, or 90 per cent of the registered tonnage. These ships were built mostly about 1900. Both the Cunard and the White Star ships just mentioned are coal burners, so the factor of oil fuel in double bottoms is not involved. In the tabulation by speed these ships are reckoned at 14 and 13 times, respectively, the figures just stated.

Why Cargo Liners Are Superseding Tramp Ships.

The growth of shelter deck construction, the use of oil as fuel to be carried in double bottoms, and motorships have not only added to the carrying capacity, but have permitted increase in moderate speeds and facility of turn-around in port, factors to which are attributable in part the growth of the cargo liner and the decline of the tramp ship in transoceanic and interoceanic transport. Thus, the improvements in shipbuilding have reinforced the economic and political forces impelling a concentration of ownership and operation in transoceanic shipping — tendencies which the necessities of war compelled governments first to stimulate, then to direct, and in the end themselves to exercise to the fullest extent.

[Atlas Photo Service, Cambridge, Mass.]

OLD IRONSIDES

A great deal of sentiment has been aroused recently through the reported intention of the Navy Department to dismantle and scrap the historic old frigate Constitution. We are glad to be able to state that latest reports show that she will be refitted completely and will once more be put in condition to sail the seas as of old. This is to be made possible by the contributions of school children from all parts of the United States, a movement sponsored and assisted by the Fraternal Order of Elks. It is noteworthy, also, that Pacific Coast lumber men have offered to supply masts from Douglas fir trees selected from a tract on Bainbridge Island, Puget Sound, named, by the way, after her old commander. Our illustration is from the painting by C. Myron Clark, of Boston.

Logical Pacific Coast Markets

An Analysis Presented to the San Francisco Meeting of the Pacific Foreign Trade Council

By A. F. Haines, Vice-President, Admiral-Oriental Line

COMMERCE is like a river—it follows the channels of least resistance, is sensitive to obstructions, makes new routes when conditions justify, and wends its course to the markets of demand. Its unrestrained, natural flow is the economically correct and logically sound markets. The creation of artificial conditions, over-stimulation, over-expansion, produces depression and crises, the reaction of which is detrimental.

To answer the specific question "What are the logical markets of the North American Pacific," one has merely to refer to a sailing schedule of the arrivals and departures of vessels from Pacific Coast ports. This shows that 75 countries are served and bills-of-lading cover cargo destined to or originating at 260 different foreign ports.

With direct steamship service to all seas and to the commercially prominent countries of the world, there is a foundation for the conclusion that the world is the logical market of the Pacific. No one section of the universe is more prominently represented than the Pacific Coast, or can boast of the fact that its own natural products are responsible for bringing to its ports ships flying flags of the principal maritime nations of the world—American, British, Japanese, Danish, French, Italian, Norwegian, Swedish, Chilean, Dutch, German, Mexican, and Pan-American; or can credit itself with the fact that its commodities are necessities for the life comfort of people in foreign countries and are produced in quantities which can supply their needs and are practically without competition from any other section of the world. Vessels go where there is cargo to offer. On the Pacific Coast four products are shipped in quantities of entire cargo lots, and at least five other commodities often constitute the bulk of a ship's cargo. The products which this section of the United States has to offer in such quantity lots are petroleum, lumber, grain, flour, condensed milk, canned salmon, fruits, copper, and paper. These, together with the overland cargo contributed by the transcontinental railroads, have been the main reasons for the coming of vessels of all nations to the Pacific Coast of the United States.

Foreign markets are not measured by their distance in miles. They are measured by the frequency of service. Trade calculates its requirements sufficiently in advance to supply needed quantities during seasons when these products are in demand. On the Pacific Coast they can count on almost daily service to the Orient, weekly service to Europe, Australia, and South America, and daily service to Atlantic ports.

Sixty-six million tons is the annual combined tonnage of inbound and outbound foreign, intercoastal, and coastwise cargo of Pacific ports. Eleven million tons made up the total import and export tonnage of the foreign trade. It is also interesting to know that the Pacific Coast contributed 12 per cent to the foreign trade tonnage of the United States. One half, or over nine million tons, of the total intercoastal commerce of the United States was contributed by Pacific ports, the outbound being over twice as much as the inbound.

Pacific Coast Production.

Just to give an idea of the magnitude of the production of the Western States and to indicate why this section of the United States claims as its markets the **world**, the following figures are quoted:

Annual production, 1925, for Washington, Oregon, Idaho, Montana, Wyoming, California, Utah, Nevada:

100	million bushels of	Wheat	46	million boxes of	Apples
25	" " "	Corn	16	" "	Peaches
45	" " "	Barley	10	" "	Pears
53	" " "	Oats	18	" "	Oranges
32	" " "	Potatoes	5	" "	Lemons
15	" tons "	Hay			

Canned Salmon Pack, 1925, for the Pacific Coast, including British Columbia, was 7,350,000 cases.

Lumber. Ten billion board feet will be the 1926 lumber production of the West.

Note that these commodities are not luxuries and that any country to which you may travel will have some one of these on the market, purchased from this section of the world.

In an effort to aid you in visualizing the production and transportation of the western slope, the following word picture is given you:

American Markets.

The American Railway Association, Car Service Division, estimates that two and a half million cars will be the freight car requirements of the Rocky Mountain-Pacific States for 1926. A statement issued by the United States Shipping Board reveals the fact that the combined foreign, intercoastal, and coastwise water-borne traffic of the Pacific Coast amounted to sixty-six million tons, which, if carried in box cars of 30 tons each, would require two million 200 thousand cars. An average box car measures 40 feet in length; therefore a freight train long enough to carry the land and water-borne cargo of the west would cover a mileage of 34,000. Imagine a continuous moving freight train girdling the earth at the equator, with a sufficient number of freight cars left over to reach from Yokohama to New York.

The United States is considered to be a great wheat producing nation. The Pacific Coast in 1925 furnished to the world a quarter of the quantity of this trade, 15 per cent of the vegetables, half of the fruits, one-third of the petroleum products, one-fifth of the copper, and half of the lumber.

The agricultural districts of the western slope of the United States consume 10 per cent of the imported fertilizers of foreign countries to rehabilitate the land for continued reproduction. Of the 18,775 tons of raw silk imported into the whole of the United States from Asia and Europe combined, the Pacific ports imported all but 470 tons. Its gateways were used for 15 per cent of the jute, another raw material which keeps American industries busy and furnishes employment to thousands.

World Markets.

The Pacific Coast in the next era of the country's advancement is to furnish a major part of the nation's exports. The Great West is to furnish lumber to modernize and improve the building program of the world. The plains and valleys of the west will be the world's bread basket. With long years of patient upbuilding to be effected before Europe can stand once more on a sound financial footing, America must look to the countries of the Far East for markets for her goods. The greater part of the population of the world is included in lands bordering on the Pacific Ocean. The combined population is over 800 million. The commerce per capita of these countries with the United States (average for ten year period) range from 19 cents to $78 per annum.

In spite of the many obstacles which trade in China has had to meet, there is every indication that **China's** foreign trade column for 1925 will not fall below that of the previous year.

During the past year **Japan** has made remarkable progress toward solving its economic difficulties. The industries in that country are more prosperous than at any time since the war-time boom. Financial conditions are very much improved. The pressing problems rising from the earthquake of 1923 have been solved. A noteworthy accomplishment of their reconstruction program has been the consolidation and reorganization of many of the smaller banks and business undertakings.

Philippine Islands economic conditions in 1925 maintained the steady upward progress which has characterized the business of the Islands. The improvement in the year was substantial and the prospects for 1926 are that it will advance over 1925. The progress made in the last two years, and especially the latter, has resulted in a marked return to stability which is more fundamental than at any time since the war.

The **Australian Commonwealth** fared very well in 1925 in spite of several diverse factors tending to blight the year. The wool crops were exceptionally good. Foreign trade appears to be getting back on a favorable basis, and, from all indications, American goods will enjoy the same demand in Australia in 1926 as they did in 1925.

India has passed through what may be termed one of the best years in its history. The foreign trade outlook is excellent, particularly for manufactured goods such as are imported from the United States; and it is believed that American manufacturers generally will enjoy a good demand in India during the present year.

The trade of the United States with **Europe** rests upon a sound foundation of commercial enterprise, value, and service and will continue to increase in proportion to the efforts of American exporters to strengthen their position in this logical field of commercial expansion.

Estimates of trade of the United States with **Latin-America** for 1925, based on the eleven months ending November, show an increase of more than $100,000,000 over the previous year.

United States Solvent.

The following statistics indicate that the United States is a solvent corporation:

The foreign trade of the United States in 1925 increased more than one billion dollars. The increase in imports was 618 million dollars and exports about 400 million dollars. The increase of imports was about 218 million dollars greater than the increase in exports.

The net national debt has been reduced from $75.99 per capita a year ago, to $68.27, the smallest of any principal nation aside from China. Our national wealth is estimated at 390 billion dollars, greater than that of any other two nations.

In 1925, 852 million dollars was the interest paid on the public debt against 917 million dollars in 1924.

The estimate of taxes collected by federal, state, and local governments in 1924 was 7 billion 907 million dollars. There were over 7½ million persons who filed income tax returns in 1924, which indicates the high wages paid in this country.

The War Finance corporation will close business and return to the government its entire rotating capital of $500,000,000 plus 4¼ per cent interest. The corporation since 1918, has loaned $690,000,000 of which the farmer got $298,000,000.

The Panama canal earned last year $23,000,000.

The total resources of national banks on September 28, 1925, were 24 billion, 570 million dollars. Savings deposits on June 30, 1925, were 23 billion dollars.

The value of the United States gold production in 1925 was 49 million dollars.

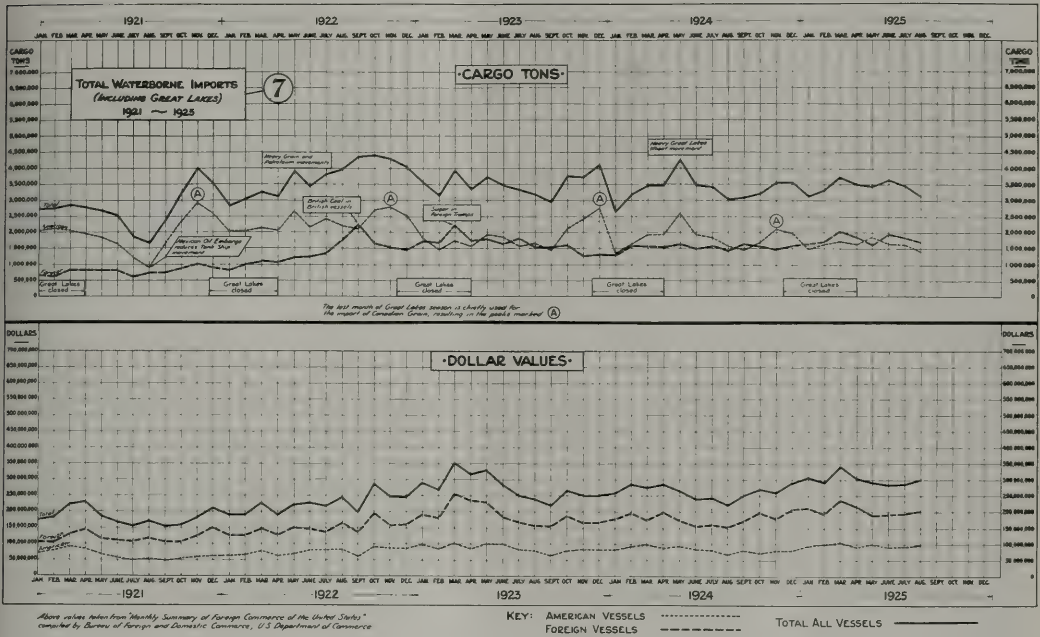
On January 1 the money in circulation was $43.62 per capita. Stocks of gold coin and bullion were $4,409,000,000.

Foreign loans sold in this country totaled $1,065,000,000 in the first nine months of 1925.

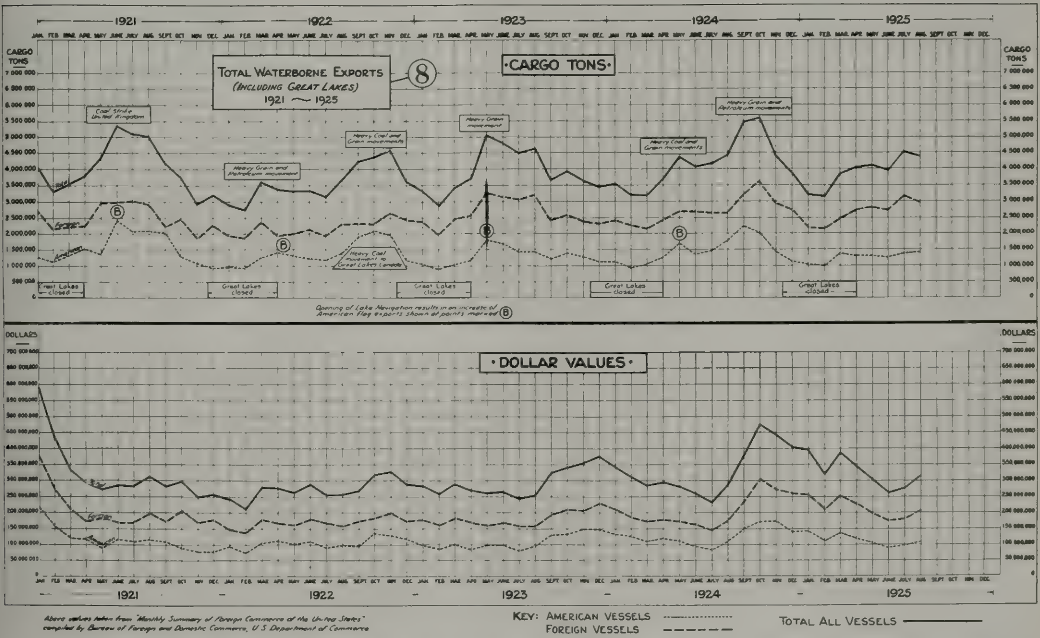
Our foreign trade today represents more than an opportunity. It represents a responsibility.

A quiet day on Channel Street, San Francisco, showing the wholesale grocers' warehouse of the Southern Pacific Company, left center, and the new warehouse of the Board of State Harbor Commissioners, right center. Note freight steamer discharging onto pier and lighters simultaneously.

American Foreign Trade at a Glance



Above values taken from "Monthly Summary of Foreign Commerce of the United States" compiled by Bureau of Foreign and Domestic Commerce, U S Department of Commerce



Above values taken from "Monthly Summary of Foreign Commerce of the United States" compiled by Bureau of Foreign and Domestic Commerce, U S Department of Commerce

Four graphs, prepared by the United States Department of Commerce, showing the total movement and value of American imports and American exports for the five-year period ending July 31, 1925

Electric Propulsion for Large Passenger Liner

An Interesting Analysis of the Power Plant to be Installed in the New Intercoastal Passenger and Freight Steamer for the Panama-Pacific Line

IN a paper read before the North East Coast Institution of Engineers and Shipbuilders at Newcastle, England, February 12, 1926, Eskil Berg of the General Electric Company gave the following analysis of the turbo-electric drive to be installed in the passenger liner now building for the International Mercantile Marine Company, Panama-Pacific Line, at Newport News Shipbuilding & Drydock Company.

The dimensions and particulars of this ship are as follows:

Length, 600 feet.
Beam, 80 feet.
Draft, 30 feet.
Displacement, 22,000 tons.
Propeller speed, 120 r. p. m.
Horsepower, 17,000.
Speed, 18 knots.
Propellers, 18 feet 6 inches diameter, 17 feet 3 inch pitch.

Steam Conditions:—Steam pressure at throttle, 250 pounds; superheat at throttle, 100 degrees Fahrenheit; vacuum, 28½ inches.

Boilers:—12 Babcock & Wilcox oil burning marine boilers each having 4600 square feet of heating surface and 1344 square feet of superheating surface.

Electrical Equipment:—2 General Electric turbine driven, alternating current generators having a rating of ATB 2—660 kw.—2888r.p.m.—4000 volts.

2 General Electric main synchronous induction motors for direct connection to the propeller shafts, having a rating ATI 48—6600 kw.—120 r.p.m.—4000 volts.

4 General Electric 500 kw. direct current generating sets.

1 General Electric control board.

Weights:—In this case no attempt has been made to reduce the weight of the apparatus from that used for land purposes.

The weight of the two turbo-generators, including all accessories, tools, etc.	306,000 lbs.
The 2 main propelling motors weigh	338,000 lbs.
Complete control equipment including cables	17,000 lbs.
Total	661,000 lbs.
Weight per shaft horsepower	39 lbs.

The price of the electrical propelling equipment complete in this case is substantially the same as the geared turbine equipment proposed for this ship, but on account of simpler and less costly foundations, piping, oiling system, etc., it was found to be cheaper than any other method of propulsion proposed.

Control apparatus consists of the necessary contactors for closing the electrical circuits between the generators and motors. It will be operated by means of four levers, two for each motor. In addition there will be two small levers for regulating the speed of the main turbines. Each propulsion motor has two main levers, one for regulating the excitation of the generator and the motor and the other for reversing, the latter having three positions, "ahead," "stop," "astern."

The field regulating lever has four definite positions, "off," "1," "2," "Run."

On position "1" double excitation is applied to the generator alone. In this position, with the reverse lever on either "ahead" or "astern," the propelling motor is started or reversed as a pure squirrel cage induction motor. In position "2" normal excitation is applied to the rotor field, leaving double excitation on the generator. In this position the motor phases in and becomes a synchronous motor. Position "Run" reduces the excitation of the generator to normal.

Speed variation of the propeller revolutions in either direction is obtained by varying the turbine speed and is controlled by the operator from the small speed lever on the control board. Normally both turbo-generators are in operation. Should, however, it be desired at any time to operate the ship at three-fourths speed or lower for a considerable length of time, only one generating unit need be used and both propelling motors can be operated from the control board exactly in the same way as when both units are running. This feature should prove very economical should the ship ever be used for cruises during the slack season, as almost 15 knots can be obtained on one generator.

Reversing Ship at full speed:

First:—Set levers controlling speed governor on turbine to low speed position.
Second:—Put both field levers to "off" position.
Third:—Pull reverse levers from the "ahead" position to the "astern" position.
Fourth:—Pull the field levers to the "1" position and hold them there until the propeller speed indicators show that the propellers have reversed and come up to constant speed in the opposite direction.
Fifth:—Pull the field lever to notch "2" and note by instrument when motors pull into step.
Sixth:—Then put field levers to "Run" position.
Seventh:—Move turbine speed lever to any desired propeller revolutions per minute.

Reversing Torque:—The motors and the generators are designed to give the necessary torque to reverse the propellers from 120 ahead to 120 revolutions per minute astern in 20 seconds. Quicker reversal can be had but is not considered advisable.

Steam Consumption: When operating with 250 pounds gauge pressure and 100 degrees Fahrenheit superheat at the throttle and with 28½ inches of vacuum, the steam consumption per shaft horsepower delivered to the propeller shaft (including all losses in generators, motors, cables, etc.) will be 9.5 pounds when delivering 17,000 horsepower at 120 revolutions per minute on the propeller shaft. When delivering 13,500 horsepower at 110 revolutions per minute under the same steam conditions the consumption will be 9.9 pounds. Considerable margin is included in these figures to take care of sea conditions and inaccuracy of tests.

Fuel Consumption: If electrically driven auxiliaries are used, the fuel consumption per shaft horsepower hour, including everything on the ship, figures at 17,000 horsepower to be 0.85 pound per shaft horsepower and, at 13.500 horsepower 0.90 pound. In these calculations slightly over 1000 kilowatts direct current load has been assumed at 17,000 as well as 13,500 horsepower conditions.

Superheat: This ship will be operated with only 100 degrees Fahrenheit superheat. The design of the turbine, however, permits efficiently and safely 300 degrees Fahrenheit of superheat.

The fuel saving by going to 200 degrees as compared with 100 degrees would be 5 per cent, and 9 per cent would be gained by going to 300 degrees.

Electric propulsion is particularly well adapted to high steam temperatures as all the reversing is done electrically and no undue heat stresses or temperature changes take place in the turbine itself, as is the case when mechanical gears are used.

Efficiency of Transmission with Electric Drive: In making comparison of transmission efficiency between geared turbine drive and electric transmission we must not compare the gear efficiency alone with the efficiency of the electric transmission. Such comparison is very misleading. In the case of this liner, for instance, if gears were to be used, the turbine design, as well as the gear design, would have to be compromised in order to compensate for the limitations imposed by the gears.

Assume single reduction gears which were, as a matter of fact, first proposed for this vessel. It was found necessary to build the turbine in three casings in order to get proper pinion design. The revolutions per minute of the turbines proposed were less than half that proposed with electric drive. Steam seals and the number of packings were three times as many as for electric drive. With electric drive it is possible to design a much more efficient turbine because we have:—

1. Increased efficiency due to the use of higher speed turbine.
2. Increased efficiency due to the elimination of the reversing turbine losses.
3. Increased efficiency due to the elimination of all cross-over connections between turbines, as the electric turbine is built in one casing, making an ideal turbine design.
4. Increased efficiency due to the lesser number of packing glands and steam seals.
5. Increased efficiency due to closer running clearances in turbine for the same factor of safety, as no excessive temperature changes take place while reversing or maneuvering.

From the above it will be seen that the actual transmission efficiency is not an index as to the comparative economy of the two methods.

Electrical Losses: At 17,000 horsepower load and 120 revolutions per minute of the propellers, the generator has an efficiency of 96.75 per cent excluding the excitation which in this case will be 32 kilowatts per generator, or less than ½ per cent.

The motors will have an efficiency of 97.5 per cent excluding excitation which amounts to 45 kilowatts per motor, or 0.68 per cent.

The loss in cables and control amounts to 0.04 per cent.

The total transmission loss is, therefore, excluding excitation, about 5.7 per cent or, if excitation is included, about 6.75 per cent.

For larger powered ships the efficiency becomes, of course, better and a total loss of slightly less than 6 per cent may be expected.

At reduced speed of the vessel the efficiency of the generator and motors remains practically constant, as the voltage is then reduced in about the proportion of the square root of the horsepower so that at three-quarters speed the voltage is reduced from 4000 volts to about 3000 volts, and the transmission loss is only increased from 6.75 per cent to 7.4 per cent, although the load is reduced from 17,000 horsepower to about 7000 horsepower. The loss in gear efficiency, under similar conditions, would be about 2 per cent.

* * *

Longitudinal Bulkhead Fallacies

By Chas. F. Gross, A. M. I. N. A.,
Asst. Prof. of Marine Engineering and Naval Architecture, University of California

THE question of the subdivision of the hull to insure that a vessel remain afloat with any compartment open to the outside sea is a very important factor in the design of merchant ships. We obtain this subdivision by a combination of transverse and longitudinal bulkheads. In some types of vessels the bulkheads have relative degrees of importance. But because the placing of a longitudinal or transverse bulkhead in a tanker, grain carrier, or naval vessel is is of merit does that merit signify that that bulkhead will be a good thing in a ferry steamer? And this is the point I want to make—that longitudinal bulkheads, such as have been incorporated in the majority of the ferry steamers existing on American waters as well is in new ferry steamers recently contracted for, are a fallacy. They give the traveling public a false sense of security which raises the question of alternate methods that might have been used to obtain the necessary protection which these bulkheads are intended to render.

For the information of those who do not know the type of construction ordinarily used in ferry steamers, it might be said that these steamers are divided by an appropriate number of transverse bulkheads, and in addition, there is a longitudinal bulkhead parallel to the centre line on either side located about one-sixth of the beam inboard. The spaces formed between these longitudinal bulkheads and the side shell are used in most cases for fuel oil or for fresh water. In other types of ships these spaces have served different ends; namely, coal bunkers and dead air spaces or explosion chambers, as they are designated in naval vessels.

The profession of the art of designing the construction of vessels is placed in the hands of men whom we call naval architects. Absolute faith is placed in the designer, and he is given a free hand to mold a vessel to his ideas, but at the same time making it comply with the rules of a classification society, the United States Navigation Laws, and the Steamboat Inspection

Service Regulations. All three sets of rules are most exacting and stringent and must be adhered to in order to meet the approval of these respective bodies. These regulations, however, are sadly lacking in the important point relating to the stability of a steamer.

Since September 1922, the Department of Commerce through its Steamboat Inspection Service has required that all new passenger vessels over 500 gross tons be subjected to an inclining test in order to determine their metacentric height. Definite instructions are given for conducting this test, particularly stating that the ship shall be entirely free of liquid in the boilers, tanks, or other compartments. They thus want to avoid any free water surface having a detrimental effect on the correct metacentric height in the light condition. But after the ship is in commission some of its tanks and certainly its boilers will be filled or partially filled with liquid, thus having the effect of raising the vessel's virtual center of gravity, which is an extremely dangerous thing to do, especially when a steamer is carrying a shifting cargo of deck passengers.

This brings me to the point that these longitudinals in ferry steamers are not in accord with proper principles of hull design for the following reasons:

1. Their efficiency is questionable in case of piercing on one side of the shell.
2. They expose small or large surfaces of free water, depending on their subdivision, which has an effect of raising the virtual position of the center of gravity of the vessel.
3. The idea of these longitudinal bulkheads is contrary to the report of the Bulkhead Committee of the British Board of Trade.

Let us take up these questions in the reverse order. When the steamship Titanic was sunk after striking an iceberg in April 1912, much insistence arose that our ships should be more completely subdivided to insure against further occurence of such a catastrophe. This led to the appointment by the British Board of Trade of a committee to consider and report on the subdivision of merchant ships. Some of the findings and recommendations of this committee have been adopted by most maritime countries; but the majority of the details which are included in the 75-page report have been left to naval architects to incorporate into their designs as best they could. Although ferry steamers do not get out of sight of land, the hazards of collision under which they operate are probably greater than those of large passenger vessels which have the whole ocean to maneuver upon. Likewise, the displacement per passenger is larger in an ocean going passenger vessel than in a ferry steamer, and due to this variation we should have greater protection in the ferry steamer. Protection by longitudinal bulkheads does not give this.

The particular clause referring to longitudinal bulkheads I am quoting verbatim from the report of that committee as I do not want to discolor or give my own interpretation.

Recommendations British Board of Trade.

"We have given careful consideration to the question of fitting longitudinal vertical sub-division, especially in the form of side bunkers, and we are of the opinion that sub-division does in certain circumstances constitute an addition of safety to the vessel. Extensive flooding of bunkers on one side of the vessel, however, might cause a heavy list and, apart from the danger of capsizing, might render it difficult to utilize all the boats or to maintain her navigability. Many suggestions as to the manner in which such listing might be counteracted have been put before us. Certain of the suggested arrangements consisted of means of allowing water to flow into the side compartments opposite to those damaged, e.g., by means of sea cocks or interconnecting ducts. We do not feel justified in advising that any of these should be accepted so far as water-tight side bunkers are concerned. Arrangements for pumping water into such side bunkers might, however, be accepted if the details were satisfactory, and arrangements for interconnecting oil-bunkers or spaces between double skins by pipes or ducts might be accepted under the same conditions. It must be recognized, however, that in the event of an accident causing the immediate flooding of the bunkers or other spaces on one side, no arrangements would be sufficiently speedy to prevent a list developing, and it is therefore necessary that if water-tight longitudinal bulkheads or inner skins are fitted, it should be proved that the margin line will not be brought under water when any space bounded by transverse water-tight partitions between the outer skin and the inner or longitudinal bulkheads on one side is flooded for a length equal to the floodable length of the vessel in that region, as determined for transverse subdivision only. The distance of an inner skin from the outer skin at any part should not be less than two feet plus two per cent of the molded breadth of the ship."

It will be observed that although the Bulkhead Committee has given its approval to longitudinal bulkheads it has done it reluctantly.

Free Water in Vessel.

Let us turn attention to point No. 2 and inquire into this question of free water in a vessel. Very few realize the dangers inherent with the stability of a ship when its tanks are partly filled with liquid or when, as we say, the liquid has a free water surface. This water, when it partly fills a tank, does not act at the center of gravity of its mass but at a point very much above the surface of the liquid. If the tank was filled, then its weight could be concentrated at its center of mass; but very few tanks are always filled. It is enough to say that if the space outboard of the longitudinal bulkheads is filled the relative height of the center of gravity is higher than if the liquid had been carried in a double bottom tank, and the position of the virtual center of gravity will be much higher when that wing compartment is not completely filled.

Let us take a thought from Percy A. Hillhouse, who is Professor of Naval Architecture at the University of Glasgow and also naval architect for the Fairfield Shipbuilding and Engineering Company. He says, "When we consider the possibilities of holing, however, we are at once met by the fact that the longitudinal bulkhead will hold the entering water on one side of the vessel or allow oil to escape from one side only, and so at once produce unsymmetrical loading and consequent listing. This listing may bring the tops of the water-tight bulkheads under the waterline and so permit of the incoming sea finding its way into other compartments, with a large increase of free surface and consequent capsizal or foundering. It is for this reason that the use of longitudinal subdivision as a means of reducing the amount of water which may enter a bilged compartment, though not actually prohibited by the International Convention for the Safety

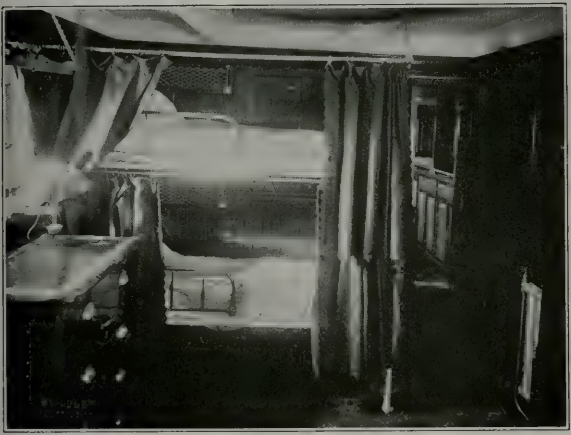
(Continued on Page 221)

THE FURNESS (PACIFIC), Ldt. LINE

PASSENGERS and FREIGHT

Dining saloon on a Furness-Pacific liner.

ONE of the by-products of the opening of the Panama Canal, and perhaps from a purely Pacific Coast standpoint of the most valuable, is the direct sea service with Europe. This service is bringing many fine vessels into Pacifc Coast harbors, and notable among these is the splendid fleet of steamers and motorships operated by Furness (Pacific), Ltd., and giving direct passenger and freight service between North Pacific Coast ports and the ports of the United Kingdom.



A two-berth stateroom on a Furness-Pacific liner.

These vessels are all built to Lloyds' highest class and are designed primarily as fast cargo liners. Each of them, however, is fitted with excellent accommodations for a limited number of cabin passengers. All of the cabins are situated on the bridge deck, amidships, and all of them are lighted and naturally ventilated by large ports opening directly into the shelter bridge deck. Especial attention is also given to adequate artificial light and ventilation; electric fans and radiators are fitted in every cabin and in all the public rooms. The cabins, so far as comfort and furnishings are concerned, are equal, if not superior, to those found on first-class passenger liners; and the long sea voyage is becoming very popular with those who have the leisure to enjoy a restful trip through a wide variety of marine scenery and climate.

Sailings in this line are made every two weeks. The vessels number eleven and average 11,000 tons deadweight capacity. Nine of them are steamers and two, the Pacific Trader and Pacific Shipper, are motorships. All of these vessels have a considerable capacity in refrigeration and carry Pacific Coast products under refrigeration direct to European markets. This feature also gives adequate provision for fresh meat, vegetables, and fruits for the table fare of passengers.

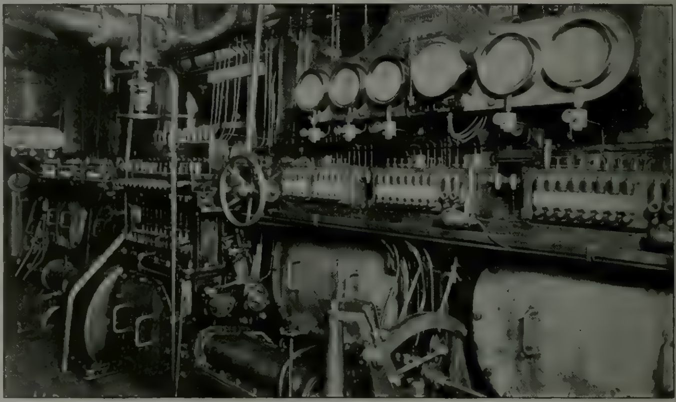
Pacific Coast agencies are maintained in San Francisco, Vancouver, B. C., Seattle, Portland, Ore., Tacoma, and Los Angeles.

Social hall on a Furness-Pacific liner.

Marine Oil Engine and Motorship Progress

Worthington Double-Acting Diesel

3000-Horsepower, 4-Cylinder, Double-Acting Worthington Marine Diesel for United States Shipping Board Passes Successful Tests



The control stand of the Worthington 4-cylinder, double-acting marine diesel.

THE first Worthington 4-cylinder double-acting 2-cycle diesel engine has now been completed, the first of the U.S. Shipping Board conversion program, and has just passed the trials specified by the Board. The trials were made at the builder's Buffalo works under supervision of Shipping Board engineers and proved a signal success for the corporation who had staked their prestige on this development.

The present conversion program, large as it is, is intended to be only the first step in a much greater program of conversion if it proves a commercial success. For this reason the engines have been selected from all types of promising diesel engines with the idea of finding out the strong and weak points in all of them as a basis for further selection. Trials in a shop where all conditions can be stabilized, where all measurements can be made so much more accurately than at sea, and where the supervision is greatly simplified is undoubtedly the best means of exact determination of the value of engines, and for this reason the shop trials have, in this case, been made much more severe and of much longer duration than usually is the case. In its idea the complex of trials is nothing else than a long uninterrupted sea voyage with its sustained full power run, maneuvering, running astern, etc., the conditions exactly for which the engines are built.

Test Standards.

The contracts required that each engine, after the builder had by tests satisfied himself that the unit was satisfactory, should be operated thirty days continuously at full load and at its rated speed. With the Worthington engine this load was 2900 horsepower at 95 revolutions per minute. After this normal load test, there were stipulated runs of:

6 hours at 10 per cent overload at 95 r.p.m.
4 hours at 10 per cent increase in mean effective pressure at 100 r.p.m.
6 hours at ¾ load.
4 hours at ½ load.
2 hours at ¼ load.
1 hour at full load astern.
1 hour of maneuvering tests.

The contracts permitted a one per cent load tolerance, 3 revolutions per minute variation in speed, and stoppages of not over 2 per cent of the total test time for adjustments not vital to the engine's performance were permitted.

Thirty Days at Full Load.

The full power thirty days' trial was commenced on February 2, 1926, and finished on March 4 and, even though it was not stipulated in the contract that the rest of the trials should follow immediately after this run, the builders had such complete confidence in the engine that the overload test and partial load tests were undertaken as a continuation of the thirty days' run without interruption or adjustments of any kind.

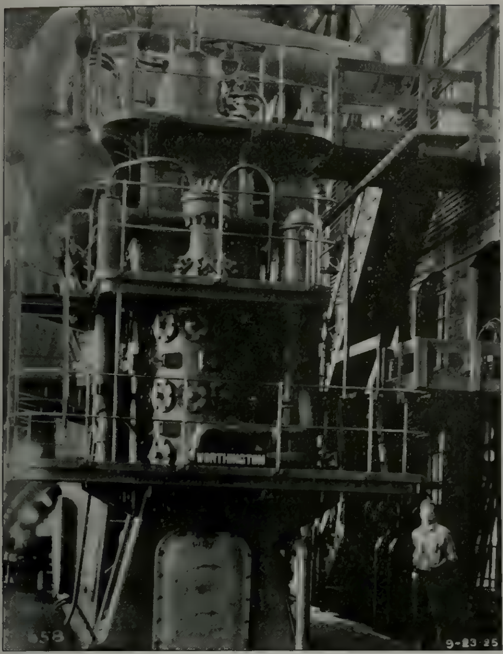
The engine ran steadily throughout the trial without any adjustments, free from vibration or laboring. The exhaust was clear at all times also during the overload test, indicating complete combustion. In smoothness of running, this engine resembles a double-acting steam engine rather than the conventional diesel engine.

These tests were finished at 5 p. m. on March 5 and, according to request by the Shipping Board engineers, the engine was left untouched until the following forenoon when the maneuvering tests were undertaken, beginning at 9:30, in order to investigate how much work it would require to start the engine up from dead cold and with cooling water at 34 degrees Fahrenheit. It was most gratifying to all concerned that the engine started up and took its load from the first charge of starting air without even having had the fuel system primed, the best confirmation of the splendid condition of the engine after the grueling test it had just passed through.

The maneuvering test was scheduled for one hour but the Shipping Board engineers were desirous of going further into this part of the program than originally planned; so that four hours were taken up with maneuvers of various kinds.

Maneuvering Tests.

It was found that 24 starts alternately ahead and astern would be made on an 855 cubic feet capacity air tank between 350 and 200 pounds, as against a



Forward end of Worthington 4-cylinder, double-acting marine diesel showing air pump.

guarantee of twelve starts, despite the handicap in the shop compared with conditions on shipboard that the air tanks were placed about 150 feet away from the engine. The engine could still be started at 85 pounds starting air pressure. The time for reversal of the engine from full speed ahead to the first ignition in astern direction averaged 8.55 seconds with a minimum of 4.8 seconds. These maneuvers were carried out by several engineers some of whom had not before started a diesel engine.

Fuel Oil.

To the complete story of the test belongs a description of the fuel oil used. It was a heavy asphaltum base fuel oil of about 20 degrees Baume, as specified by the United States Navy for use under steam boileds; its quality is distinctly inferior to the oil sold under the name of diesel oil which is generally used in motor ships. The use of such a heavy fuel oil is a decided economic advantage for a motorship as the price per barrel is much lower for the heavy than for the light oil and as a barrel of heavy oil contains 5 per cent more pounds of fuel than a barrel of light oil. Even though the fuel oil consumption of a diesel engine generally is higher per brake horsepower when such heavy oil is used, this increase is trifling compared with the saving in dollars and cents due to the cheaper price of heavy oil. It was therefore a wise move on the part of the Shipping Board to specify this inferior fuel which makes the trial much more indicative of the commercial value of the engine than any trial on light oil could be.

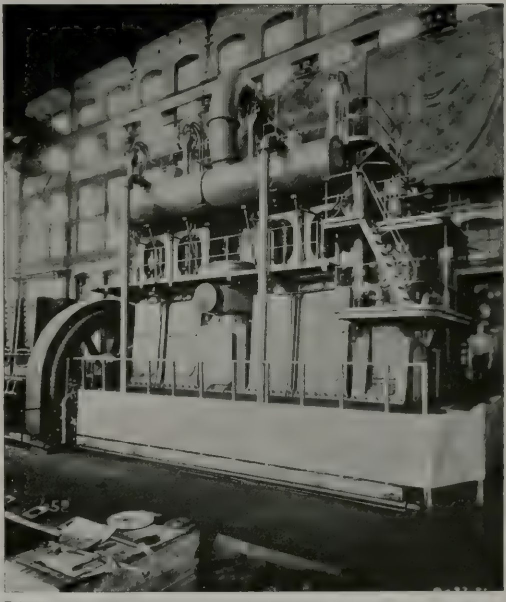
Lubricating Oil.

Another factor in motorship economy is the consumption of lubricating oil, because the price of 3 gallons of cylinder lubricating oil is equal to the price of one barrel of fuel oil. The guarantee for lubricating oil consumption including everything was 24 gallons per 24 hours; the actual consumption was 15 gallons even though much more stress would naturally be laid on safety than oil economy during a trial of this importance where a hot bearing or a scored cylinder would mean the loss of a very expensive trial.

Physical Condition.

The most significant indication of the dependableness and life which may be expected of an engine of this kind is found in the physical condition of the engine parts subject to wear after a long trial under heavy load on inferior fuel oil. The greatest interest was therefore taken in this examination immediately after the finish of the tests. It was found that the liners were in excellent condition. The surface was covered with a continuous oil film and, after having been cleaned, the surface was found polished and entirely free from any trace of score or burnish. The wear recorded on the liners for 67 days' running averaged 0.002 inch, and, by comparison with records of the best diesel engines in service in this country, it is found that this engine had surpassed all previous records in this respect. It is often said that 2-cycle diesel engine liners are subject to more wear than 4-cycle liners; but this is not to be the case with this particular engine where special care has been taken in efficient cooling of the liner and introduction of the lubricating oil uniformly over the entire liner surface.

The piston rings were found to be entirely free, clean, well oiled, and floating in the grooves. The piston rod packings were in a similarly satisfactory condition, and the wear on the piston rod was 0.001 inch. The spray nozzles were entirely free from carbonized oil as was expected because the engine had showed



Exhaust side of Worthington 4-cylinder, double-acting marine diesel on the test block at the Buffalo Works of the Worthington Pump and Machinery Corporation.

clear exhaust during the entire run and no change was recorded in the fuel oil consumption as the test progressed.

A summary of the test results is given below in accordance with the official records, which are based on an efficiency of 95.1 per cent of the alternating current generator which was direct-connected to the diesel engine and absorbed the power developed. This efficiency was determined by an A.I.E.E. code test undertaken by the General Electric Company, but the builders are in considerable doubt about the accuracy of such a test if applied to this old used generator which has been rewound for a lower voltage and which was badly overloaded. Their doubt is based on the fact that the results as to mechanical efficiency and fuel oil consumption per brake horsepower do not come up to previous results found by experiments on a single cylinder engine of the same dimensions but connected to a water brake. It is the builder's intention to undertake an input and output test on this generator in order to get a check on the generator efficiency. The data given below are therefore not in all respects final.

Summary of Results of Thirty Day Test of Worthington Double-Acting 2-Cycle Diesel Engine:

Date of Test	February 2 to March 4
Location	Buffalo, New York
Builder	Worthington Pump and Machinery Corporation
Test conducted by	United States Shipping Board
Bore	28 inches
Stroke	40 inches
Number of cylinders	4

Duration of test, hours	720
Revolutions per minute, average	96.4
Total revolutions	4,164,952.
Brake horsepower, average	2907
Indicated horsepower, top of cylinder	558
Mean indicated pressure, lbs. per sq. in.	93.2
Indicated horsepower, bottom of cylinders	448
Mean indicated pressure, lbs. per sq. in.	83.7
Indicated horsepower, total	4035.
Mean indicated pressure, average	88.5
Mechanical efficiency, per cent	72.7
Air compressor indicated horsepower	187.8
Scavenging pump indicated horsepower	194.
Fuel, tons per 24-hour day	15.14
Fuel, per hour, lbs.	1413.
Fuel per i.-hp.-hr., lbs.	0.332
Fuel per b. hp.-hr., lbs.	0.462
Thermal efficiency, brake, per cent	29.6

Lubricating oil. gal. per 24 hours

Power clyinders	2.79
Stuffing boxes	4.25
Air compressor	0.46
Scavenging pump	0.17
Hand feeds	0.26
Crank case	7.07
Total, gallons per day	15.

Cooling water, gal. per b.hp.-hr. 5.5

Temperatures

Cooling water, deg. F. to comp. 35 from comp. 40
" " " " " engine 40 from engine 120
" " " " " pistons 40 from pistons 105
Exhaust temperature, deg. F. 532
Lubricating oil, deg. F. to eng. 95 from engine 96
Fuel oil, deg. F. 89
Engine room, deg. F 68
Outside air, deg. F. 29

Compressor Air Temperatures

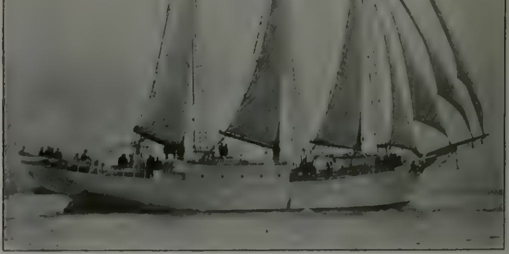
1 stage, deg. F. to cooler	142	from cooler	43
2 stage, deg. F. to cooler	139	" "	43
3 stage, deg. F. to cooler	138	" "	42
4 stage, deg. F. to cooler	234	" "	77

Pressures

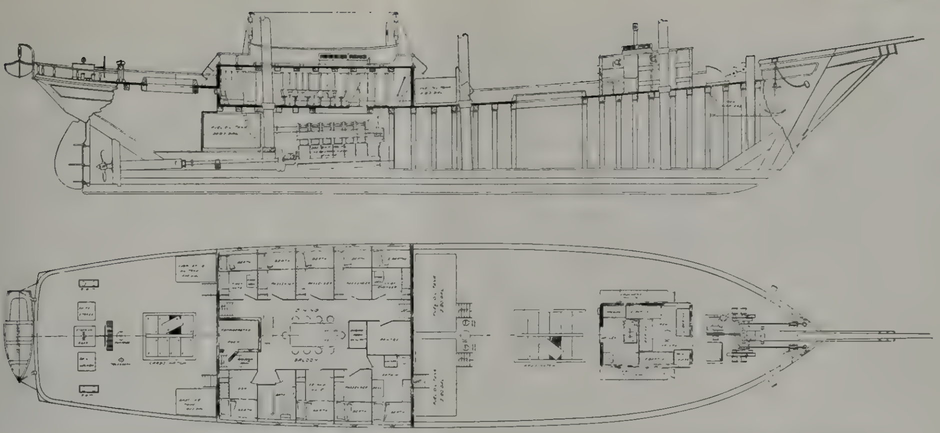
Injection air, lb. per sq. in.	890
Standby air receiver, lb. sq. in.	869
3 stage of compressor, lb. sq. in.	246
2 stage of compressor, lb. sq. in.	74
1 stage of compressor, lb. sq. in.	24
Scavenging air, lb. per sq. in.	1-11/16
Lubricating oil, lb. per sq. in.	12
Cooling water, lb. per sq. in.	30
Barometer, in.	29.09

The fuel used had characteristics as follows, although some samples received were as low as 14 degrees Baume:

Gravity, Baume, at 60 deg. F.	20.19
Flash point, deg. F.	177
Burning point, deg. F.	270
Viscosity, Saybolt, at 122 deg. F.	181
Hydrogen, per cent	13.02
Oxygen, per cent	0.37
Carbon, per cent	85.29
Water, per cent	0.11
Asphalt, per cent	5.95
Sulphur, per cent	0.37
Ash, per cent	0.08
Heat value, B. T. U. per lb. high value	18,733
Heat value, B. T. U. per lb. low value	17,680



South Seas trading auxiliary motor schooner Doris Crane, one of the most beautiful products of the yard of W. F. Stone & Son, Oakland, California.



Inboard profile and deck plan of auxiliary schooner Doris Crane. This vessel is equipped with a 300-horsepower Pacific-Werkspoor diesel.

Auxiliary Motor Schooner Doris Crane

THE application of the heavy oil engine to a field far removed from the sources of supply is perhaps as good a proof an anyone could wish of the reliability and trustworthiness of this type of prime mover. The auxiliary motorship Doris Crane was built as a three masted gas engined schooner for the South Sea Islands trade to carry supplies for the Fanning Island staff and Pacific Cable Board from San Francisco, returning with copra produced on Fanning and Washington Islands for Fanning Island Ltd., owners of the vessel. She has since been converted from gas to diesel engine drive. The reports of the successful operation of this type of engine coming from this distant trade area reveal very clearly the economies in operation effected by the oil engine, and conversions are constantly increasing in this field.

The general particulars of this vessel are:

Length, over-all	138′0″
Length, molded	123′6″
Beam, extreme	32′0″
Beam, molded	31′2½″
Depth, molded	13′0″
Depth, bottom of keel	14′8¼″

The vessel is equipped with a single 6-cylinder Pacific-Werkspoor, direct reversible, air injection, true diesel engine, with a bore of 11⅞ inches and a stroke of 15¼ inches, operating at 300 revolutions per minute and rated at 300 shaft horsepower.

A 3-stage air compressor with air coolers is direct connected to the forward end of the engine by a single crank and supplies air for atomizing the fuel and for starting and maneuvering the engine. The valves are of the monel metal disc type. The cylinders and coolers are water-jacketed. The capacity is sufficient for giving air at 300 pounds per square inch for maneuvering and at 900 pounds per square inch for injection purposes. A 2-stage air compressor, driven by a gasoline engine, is installed in the engine room and is used to fill the starting air tanks, if depleted.

The bilge and circulating pumps are of the plunger type and interchangeable, driven at reduced speed from the main engine. A day tank fuel pump is also direct connected, which takes the fuel from the main fuel tanks and discharges into the day fuel tank.

The method of disposing of the exhaust gases is through a water-cooled exhaust, which is led up alongside the mizzen mast to an exhaust silencer of the Maxim type.

Tanks were installed for fuel oil just forward of the bridge and in the after hold under the refrigeration chamber, the total tankage being 200 barrels, which is sufficient for about 24 days' service at full load .

A considerable saving of space is obtained with the diesel plant due to the smaller space required for stowage of fuel necessary to give the ship a certain cruising radius.

In the selection of this type of engine, the services demanded of this vessel have been at all times in view. She is called upon at times to make voyages to the Gilbert Islands, a distance of over a thousand miles west of Fanning Island. From Gilbert Islands to Fanning Island, the vessel has to tack the entire distance and would put the average time necessary at from 40 to 50 days, using power the most of the way bucking the headwinds all the time. On this recruiting trip, the fuel consumption with the gasoline engine varied between 12,500 and 15,000 gallons per trip, depending on weather conditions. The fuel consumption of the diesel engine is 9 barrels of crude oil per 24 hours at full load. The lubricating oil consumption runs between 2½ and 3 gallons for 24 hours.

In carrying out the conversion, opportunity was taken of installing a larger engine so that an increase in speed could be obtained. The installation was made by the Pacific Diesel Engine Company, Oakland, California, who built the engine. The auxiliary machinery was retained.

Plans for this alteration were prepared by Hedstrom and Ryan, consulting naval architects of San Francisco, and the work was carried on under the supervision of this firm.

In conclusion it may be said that many applications of the full diesel engine to ships of this type can be confidently anticipated in the near future.

Stern Wheel Towboat Colorado

Quartering view of the stern wheel tug Colorado, built by the Sun Shipbuilding Company, Chester, Pennsylvania, for the South American river service of the Imperial Oil Company of Toronto, Canada.

ABOUT the first of June 1925, the Sun Shipbuilding Company, Chester, Pennsylvania, delivered to the Imperial Oil Company of Toronto, Canada, a sternwheel river towboat for work on South American rivers. This boat is of considerable interest inasmuch as it represents the combined practical experience and naval architectural ability of many years of river steamboating in America, as gathered by the Marine Department of the Standard Oil Company, and the technical organization of the Sun Shipbuilding Company.

In designing a vessel of this type, the entire structure is framed up to special power requirements. In this case it was necessary to have an effective 650 horsepower on the stern wheel turning 20 revolutions a minute. The power plant worked out for this purpose consisted of two locomotive type oil burning boilers designed on a basis of 4 square feet of heating surface per indicated horsepower. These were to deliver steam at 225 pounds boiler pressure to the usual double 13-inch by 26-inch diameter and 84-inch stroke tandem compound engines driving the wheel through connecting rod and crank in the usual western steamboat style. A marine type condenser was also provided to give 2½ square feet of cooling surface per indicated horsepower and to produce a 25-inch vacuum.

The equipment and arrangement of the installation of the power plant were carried out in accordance with the usual Standard Oil tanker practice and specifications for ocean-going steamers. Weights were worked out for this entire power plant together with its usual auxiliaries of hot well, filter tank, sanitary pumps, fresh water pumps, boiler feed pumps, injectors, feed water heaters, auxiliary electric light dynamo set, refrigerating machinery, and steering gear.

The vessel's hull was designed to give proper strength for taking the strains incident to the machinery and for supporting the necessary bunker oil stores and crew on a draft of 3 feet. It is interesting to note that the whole design was carried out with a remarkable closeness to estimated figures; for in actual service, with ten days' fuel, all equipped, stores, and crew aboard, the draft of the completed vessel measures 3 feet 1 inch.

Wood has been entirely eliminated in the hull structure. Everything, including the window framing, is of steel. A great deal of credit is due to the staff of the shipbuilders for working up every satisfactory arrangement in this particular.

The general characteristics of this towboat are: Length over-all, 189 feet 6 inches; length of deck, 166 feet; molded beam, 44 feet; molded depth, 5 feet; draft loaded, 3 feet 1 inch. The framing generally consists of 3½-inch by 2½-inch by 7.2-pound angles. The deck plating and bulkhead plating are of 10.2-pound plates, increased in thickness where furnacing is necessary. The Colorado is equipped with special chucks and cleats for towing lines and with towing knees forward for shunting barges into position or for pushing them upstream. She has two powerful capstans forward operated by two vertical steam engines through shafting and bevel gearing. These capstans are used for warping and, in combination with derrick posts and booms, for handling any heavy weights.

The Colorado, as this vessel is named, will tow three 450-ton barges and will be in continuous operation. Her machinery and hull have been made as simple and rigid as possible with this operating condition in mind. The vessel has now been operating approximately ten months with great satisfaction.

With the majority of vessels trading in South American rivers the hulls have been erected, disassembled, shipped, and finally reassembled on the location. In the case of the Colorado, the vessel was completed at the works of the builder and towed to her destination in completed form. The towing arrangements were very carefully worked out. The sides and the entire lower structure were sheathed in and suitably braced in a manner quite sufficient for protection against any marine casualty excepting total loss. A good towing vessel was chosen for the job and a master of the necessary towing experience. The trip was successfully made in sixteen days without any damage resulting. The vessel was completed and delivered to the owners by the builders within six months of the signing of the contract. Inasmuch as the Sun Shipbuilding Company had had no previous experience in building vessels of this particular class and the Mississippi River shipbuilders, who had a lot of experience, absolutely maintained that the job could not be done in less than eight months full working time, this would seem to be a very fine record for the Sun Shipbuilding Company. It will be noted that the ship was built by this shipyard, delivered and towed over two thousand miles to her destination in six weeks less time than it would have taken to build her according to the estimates of the river shipbuilders.

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The Passing of the Coptic

By FRANK G. BOWEN.

ONE of the most famous of the old-time liners that plied the Pacific has gone at last, for Lloyd's Register announces that the Japanese steamer Persia Maru has been dismantled preparatory to scrapping. In 1881 she was launched as the Coptic and was one of the second-line fleet that the White Star Line was building up to reinforce its Atlantic flyers. She attracted a good deal of attention when she came out for her builders, Harland & Wolff of Belfast, had already constructed ten successful vessels for the White Star Line and she was the first ship that the company possessed built entirely of steel.

She was a ship of 4367 tons gross fitted with 4-cylinder compound inverted steam engines and three elliptical boilers, giving her a speed of 14 knots. In appearance she was the typical White Star ship of that time, one funnel and four masts, the fore main and mizzen carrying yards, with turtle backs forward and aft for increased seaworthiness. At first she was put on the New York run, as the company's Pacific plans were not complete, meeting with very rough weather on her maiden voyage and having two men washed overboard. She was a splendid seaboat, however, and was always regarded as a very successful packet on the North Atlantic.

In 1884 she was sent to Belfast for a thorough overhaul, refrigerating space for 750 tons of cargo being provided in order that she might be able to run alongside the Shaw Savill and Albion Liners on the New Zealand trade. While she was on her twelfth voyage on this route she had the misfortune to lose her commander, Captain R. E. Bence, who died at sea. His death was a real loss to the company for he was well known as a splendid seaman and had distinguished himself as chief officer of the Germanio by rescuing the crew of the steamer Hurworth in the Atlantic. In 1889 she went aground on Main Island soon after leaving Rio for Plymouth, sliding off immediately into deep water, but not being in any real danger owing to her stout construction. Twenty-four feet of water was in her forward compartment when she put back to Rio for repairs.

In 1894 she received another refit at Belfast, her machinery being altered to 3-cylinder triple-expansion engines which gave her back her original speed with a saving of coal. On the completion of her modernization she went to Cardiff for bunkers and then went out to Hong-Kong to relieve the old Oceanic on the Oriental and Occidental Line between San Francisco and Hong-Kong. In 1906 she was sold to the Pacific Mail Steamship Company, when the line on which she was running was abandoned but in order to retain her English registry she was nominally owned by the Persia Steamship Company. She thus continued on her same route, with occasional calls at the Mexican ports and Philippines, being regarded as one of the most popular ships on the Pacific.

On the Pacific Mail Line being driven out of business in 1916 by the La Follette Act, the Persia was sold to the Japanese and renamed Persia Maru, remaining on her old trans-Pacific service for some time after the Armistice. In 1922 it was reported that she had been chartered by a large party of cinema stars, headed by Douglas Fairbanks, for a cruise round the world. It was their intention to combine business with pleasure and they had been careful to select a Japanese ship in order to avoid American restrictions. Nothing came of the scheme apparently and the ship was put on the East Indies trade, coming into serious collision with the Japanese steamer Yetorofu Maru on the way out. She was laid up at Yokohama in the summer of 1924 and has remained there ever since.

Longitudinal Bulkheads

(Continued from Page 214)

of Life at Sea, is hedged round by regulations intended to safeguard stability."

Also, Professor Cecil H. Peabody and Thomas Walton, in their publications, do not speak in very high terms of the efficiency of longitudinal bulkheads.

Efficiency Longitudinal Bulkheads.

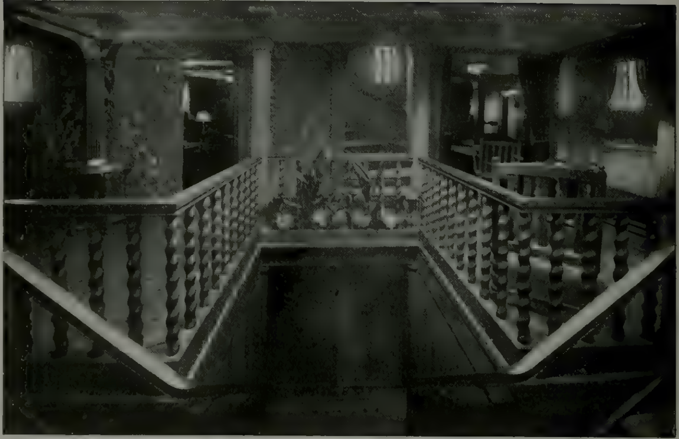
And now let us take up point No. 1; namely, the efficacy of a longitudinal bulkhead in case one side of the ship is pierced. It might be inferred from the previous discussion that it is questionable what would be the outcome of the sudden opening up of the outer skin. In all my readings from many authorities I notice that they all agree that the inclining effect caused by one side being pierced and the immediate heel caused by that side being open to the sea and the resultant list caused by taking away that buoyancy is more than can be rectified later on. The Bulkhead Committee states that suitable inter-connecting systems, of ducts, if of a satisfactory nature, would be acceptable to counteract any such heeling tendency. But instead of putting in this inter-connecting system of pipes, could not the same degree of protection be afforded if more transverse bulkheads were installed? An interesting problem recently arose with a combination freight and passenger vessel for the New York-London service. The owners were averse to the incorporating of more transverse bulkheads than had been installed in like ships already in commission. After it was shown that the ship had greater protection if several holds were open up to the sea and a quicker handling of her cargo was possible they were convinced of the wisdom of installing additional transverse bulkheads.

As all ships are a compromise between that we would like to have and which is practicable to build, why not build ferryboats so that their hulls are divided by a sufficient number of transverse bulkheads to give them bodily immersion or trim, instead of listing and trim, which would be the result if longitudinal bulkheads were called into play due to an emergency of holing through collision.

Errata

On page 162 of Pacific Marine Review for April there is a very obvious and inexcusable misprint. At the top of the second column on this page is the sentence: "At full speed and power the line shaft will be turning 1450 revolutions per minute and the turbine shafts 120 revolutions per minute." These figures should, of course, be reversed, the line shaft and propellers turning 120 revolutions at full speed.

The Johnson Line



Social hall and main stairway on the Johnson Line motorship Annie Johnson.

IN developing a direct route from Pacific Coast ports to Scandinavia, the Johnson Line of Stockholm and Gothenburg, Sweden, have built up a superb fleet of fourteen seagoing motorships designed and built especially to meet the exacting requirements of this service. This fleet includes the Axel Johnson and the Annie Johnson, each of 10,900 tons displacement; the Buenos Aires, the Balboa, and the Canada, each of 13,450 tons displacement; the Santos, the Valparaiso, the Lima, the Suecia, the Pedro Christophersen, the Kronprins Gustaf Adolph, the Kronprinsessan Margareta, the Pacific, and the San Francisco, each of 9750 tons displacement; a total displacement of 150,000 tons.

A schedule of regular monthly sailings is maintained. On the Pacific Coast the ports of arrival and departure are Vancouver, B. C., Seattle, Portland, San Francisco, and Los Angeles and, during parts of the year, Central American ports in Guatemala and San Salvador. The European terminal is at Gothenburg, Sweden, with generally at least one call at a British or a German port.

All the motorships of the Johnson Line are equipped to carry a limited number of first-class and of special third-class passengers. The Axel Johnson and the Annie Johnson, latest additions to this fleet, are modern, comfortable, even luxurious in their equipment for passenger service. Each of these vessels is equipped to take thirty first-class and thirty special third-class passengers.

The first-class staterooms, located amidship on the promenade deck, are furnished with homelike appointments for one to three passengers. Among the attractions of the cabin equipment features are comfortable new type large berths. All cabins are attractively furnished and are equipped with all modern facilities, such as electric fans, heaters, and running water.

The dining saloon, ladies' lounge, and smoking room are tastefully furnished, designed with special care as to perfect ventilation and ample light. In the dining saloon all passengers are seated at small tables, and all the appointments of this apartment are inviting and in excellent taste. The Johnson Line is noted for its excellent cuisine, and all meals are carefully prepared and delicately served. Particular attention has been given to the location and equipment of the kitchens and pantries, especially to the departments such as store rooms and refrigeration rooms, for the large quantities of food required to insure the best results and the highest quality as to cuisine and service. The smoking room is panelled and finished in light oak and is snugly arranged and furnished with club chairs.

The ladies' lounge is finished in beautifully panelled pear wood and is richly furnished and beautifully decorated. The promenade deck is exceptionally wide, and the forward part is well protected against stormy weather by sliding windows. Ample deck space in all classes provides plenty of room for deck chairs and promenading.

Johnson Line motorship Annie Johnson.

Portrait of Mrs. Johnson in the social hall of the motorship Annie Johnson

Pacific Workboats and Their Power Plants

Boatyard Notes

AN absolutely water-tight skylight on a seagoing craft is a rare thing. John Twigg of San Francisco has designed and built one that is exceptional, for it does keep out all water whether the driving spray of salt seas or the penetrating moisture of sleet and rain. Besides this, the new skylight embodies other novel and desirable features. The water-tightness is accomplished by building the leaves of the skylight with concealed piano hinges which permit of a gutter being formed along the top of the frame. Around the edges of the lifting leaves are narrow grooves into which soft rubber strips are forced, leaving about ⅛-inch recess. Aligning with these are brass strips set into the frame below, which, when the leaves are shut, impinge on the rubber making an absolutely tight joint with no breaks whatever.

Above the glass is the regulation brass rod grating but with a great improvement in the fastening. This is accomplished by the fore and aft movement of one of the brass rods, the ends of which slip into sockets. This makes a secure lock, also concealed, and is a material improvement over the old style buttons or catches.

The lifting of the leaves is done from the inside, the device to do this also being of Mr. Twigg's invention. The lifting screw is entirely enclosed leaving a smooth surface for cleaning and adding greatly to the artistic appearance from within.

Boats on the ways at the Anderson & Cristofani Yard, Hunter's Point, San Francisco

This type of skylight is being fitted to the new yacht built at the yard of John Twigg & Sons, San Francisco, for H. O Harrison. John Twigg will be pleased to show the skylight to those interested.

A handy revolving dish rack has been built by the Twiggs for the new Harrison yacht which is a marvel of handiness and utility. Much on the order of a revolving bookcase, this piece of equipment can be so made that in its base can be placed bins for flour, sugar, etc., while the upper parts are fitted for the various sized dishes and pans. The whole thing can be built into a corner and fitted with one door. This gives a most compact and admirable arrangement, particularly where space is valuable. The inner casing can be lined with sheet copper making it insect and damp proof. Such an arrangement as this will no doubt be embodied in many of the seagoing workboats where stowage space is at a premium.

* * *

A workboat for H. Liebes & Co., furriers of San Francisco, has just been completed by **Swanson's Launch and Boat Works**, Oakland, California. This craft is of the trunk cabin type and constructed very heavily as her work will be in Alaska waters. She is 35 feet long by 8 feet beam by 4 feet depth and will be powered by a 10-horsepower Standard gas engine. Besides this, the Swanson Yard will build for the same company two Nome skiff boats. These are to be used for beach work and are a modification of a dory and skiff. Very light draft with strong flare and bows and stern well cut away, they will be 18 by 5 feet. Mr. Swanson reports considerable work in hand this spring overhauling small boats and yachts.

* * *

At the yard of **William Cryer,** Oakland, F. E. Booth Company, canners, are having built a fishing workboat of 65 feet length. This vessel, like all from the yard, is a good example of the type turned out in this district. She will be driven by a 125-horsepower diesel engine built by the Atlas-Imperial Engine Company, and will be fast and sturdy, qualities requisite in her class of craft.

* * *

The yard of **W. F. Stone & Son** at Oakland is crowded with work boats, and fishing craft being overhauled and the building of several tenders keep quite a gang of men busy.

Yachts in course of construction at the Yard of W. F. Stone & Son, Oakland, California.

A busy corner of the Bagley-Nunes Yard, Oakland.

There are always repairs to be made on the fleet of workboats which operate on the bay and river waters around San Francisco. The **Bagley-Nunes Yard** at Oakland seems to have its share from the appearance of the plant when the accompanying photograph shown was taken by a Pacific Marine Review representative in April.

* * *

John Twigg & Sons, boat builders, San Francisco, are putting the finishing work on a splendid power yacht for H. O. Harrison. She will be launched about the end of May. Looking her over recently, a Pacific Marine Review representative was impressed with the fine workmanship on the job. There is no question that, when completed and ready for sea, this vessel will be one of the best appointed yachts on the Pacific Coast. With the most modern equipment and luxurious furnishings throughout, life on her will be more comfortable than at any high class hotel. John Twigg has given the job his closest personal supervision, and the result shows what a master builder can do.

* * *

Anderson & Christofani's Yard, Hunter's Point, San Francisco, has been a busy place the past few weeks. During April they turned out three 34-foot boats for the Monterey fishing fleet. There are now coming into shape one 40-foot and one more 34-foot boat for the same business.

They are also building an enclosed bridge deck cruiser 38 feet long by 10 feet depth for a San Francisco owner. This craft is unique in that there will be absolutely no soft wood used in her construction. Mahogany, laurel, oak, tulip, ash, and some rare tropical woods will make up her body and fittings. These latter will be all in natural finish. Her power plant will consist of two 35-horsepower Hirshell-Spillman gas engines, which will give her a high speed. Most modern equipment is to be installed.

At the overhauling docks and ways is the yacht Evian, which is to be thoroughly overhauled and put into the best condition. This vessel is now owned by Fred Kohler of Hollywood. The Island Transportation Company's barge No. 6 is on the ways, as are the workboats Ida May, Liberty, and Champion.

* * *

H. C. Thomsen, Hunter's Point, San Francisco, has lately rebuilt four scow schooners and put in order their power plants for the spring and summer trade in the delta trade of the Sacramento and San Joaquin Rivers. The usual overhaul and repairs on small craft are going forward as well.

* * *

Bruer & Siemer's yard, Evans Avenue, South San Francisco is busy as it most always is on repairs, as Mr. Siemer, the manager, does not care to figure on new work. His repairing business keeps a force of men pretty busy. Four workboats, two scow schooners, and a large barge were recently rebuilt and made ready for duty. In addtion two fishing workboats which got too close to the rocky coast are having new stern posts and keels put in, and part of the planking renewed.

* * *

Geo. W. Kneass Co., boat builders also at Hunter's Point, San Francisco, also report fair business, with prospects of some new jobs in the near future. Small boat work and the usual repairs occupy the working force.

* * *

Ericksen & Klepp operate marine ways at Rainier, Oregon, and are engaged in boat building, boat repairing, and ship chandlery.

They are now building two tugboats 65 feet long and 17 feet beam. One is to be equipped with a 180-horsepower Fairbanks-Morse diesel engine; the other is to be fitted with a 180-horsepower Washington-Estep diesel engine. The frames of both boats are to be of cedar, 6 by 8 P. O.; above waterline the planking is to be P. O. cedar, 2 inches.

* * *

Another job under way at the yard of Ericksen and Klepp is a cannery tender for the Chinook Packing Company, which is to have a

Workboating in the tules, a part of the fleet of workboats operated by the Fred F. Ball Company, Antioch, California.

cargo hold capacity of 10 tons of fish. The boat is to be powered with a 75-horsepower Union diesel engine. Completion date is set for May 16.

* * *

The Fred Ball Company, of Antioch, California, are the operators of three workboats and three large barges. The manager reports business as fair during the winter months, with prospects of a big increase as soon as the delta products start moving. The firm also operates three gravel dredges, supplying large quantities of that material to construction companies and others using it. The Fred Ball Company is one of the oldest in that section of the state, being over twenty-six years established. The power plants of their workboats and gravel dredges are all of Standard Gas Engine Company's make. The workboat Fred Ball has the first diesel engine built by the Standard. Since its installation it has given good service.

With the Pacific Coast Engine Builders

As a compliment to the manufacturers of the engine with which their new fishing boat is to be powered, a San Pedro firm of Japanese fishermen, headed by Y. and A. Nakasuji, have named their boat the Western-Enterprise. This boat, which is to be 86 feet long, will be used for fishing off the southwestern coast of Mexico and will be ready about May 15. It is being built by the Al Larson Boat Works, San Pedro, California. The engine is a 4-cylinder, 250-horsepower Western-Enterprise marine diesel, built by the Western Machinery Company of Los Angeles and San Francisco.

So great is the success of diesel powered fishing boats from a standpoint of economical operation that many companies are converting their power equipment to this type of engine. At the present time, in addition to a new boat being built by the Robbins Boat Works for Silva and Virissimo of San Diego, which is to be powered with a 110-horsepower diesel marine unit, the Western Machinery Company report many other orders.

The boat Superior, owned and operated by John Silva, was recently on the ways having an 80-horsepower Western-Enterprise diesel engine and auxiliaries installed to replace her former gas engine. C. F. Christensen of Rio Vista is converting the W. A. Fletcher and the Dolphin from gas engine power to Western-Enterprise diesel engines.

A converted sub-chaser, renamed the M. S. Morgan, is having two 110-horsepower twin-screw Western-Enterprise diesels installed at San Francisco Bay and is expected to be ready for general freight and tendering service about May 1.

The tanker Olinda of the Union Oil Company of California, has recently been converted from gas to diesel engine power. The order for the change was given to the Western Machinery Company of Los Angeles, and one of their 6-cylinder 250-horsepower full diesel was built for the job. The work of taking out the old engine and replacing the new was done at the San Pedro Works of the Bethlehem Shipbuilding Corporation. Twenty-six days' working time was taken for its completion. While this was being done the hull was looked over and put in the best of condition. Improvements and changes in the deck houses also were made at the same time, and the Olinda is today in better condition than when first built.

With her new 250-horsepower diesel the Olinda makes better sea speed than she did with the old 300-horsepower gas engine. In this increase, which is about one knot per hour, there is a gain of some ten per cent in time. This result is believed to be due to the more steady turning moment of the diesels. In the matter of cost for fuel the contrast is even more marked. With gasoline as fuel it cost about four dollars per hour to run full speed. With diesel oil the cost is seventy-two cents per hour.

The Olinda called at San Francisco after the engine change was made, she being on her way to Vancouver, British Columbia, from which port she will be operated to Alaska points this summer, carrying petroleum products for the owning company. The chief engineer and captain are well pleased with the new power plant, an improvement in every way over the old one. It is understood that another unit of the same size will soon be ordered by an operating company who have been impressed with the excellent showing made by the Olinda's latest Western-Enterprise diesels.

* * *

Fairbanks, Morse & Co. report considerable activity in movements of new units for workboats. During the past month several full diesel engines, direct reversible type, have been ordered for early delivery. Among them is a 120-horsepower set for the Stockton Transportation Company's ship Viking, now under construction at Colberg's Yard at Stockton, California. Another unit of the same kind has gone out for the Napa Transportation Company's new craft now building at F. L. Fulton's Antioch yard, to replace the 60-horsepower engine now in the river boat Dorothea, owned by Parker Wood of Stockton, a new 120-horsepower diesel, same pattern as those above referred to, is ordered. The Dorothea is to be lengthened 25 feet and completely rebuilt. With her new power she will be a notable addition to the fleet.

Besides these installations, several have been forwarded to the Honolulu branch for use in the Hawaiian Islands. Some are to replace the expensive steam driven pumps for irrigation.

In general the demand for Fairbanks, Morse products is brisk and would appear to denote a healthy tone in general business.

* * *

Washington-Estep diesel engines are attracting considerable attention in California ports according to the California agents, W. H. Worden Co., Inc., who, besides the San Francisco showrooms, have an agency at Los Angeles in charge of James Browner, an old time marine engineer. The firm is quoting on several prospective installations. Builders and owners to whom the special features of the new diesel have been explained are enthusiastic, and without doubt many of the Seattle-built power plants will soon be driving fishing and work boats in California waters. A 120-horsepower engine will soon be running in San Francisco, where those interested can view it in operation and under working conditions. A 110-horsepower unit is to be set up at San Pedro.

* * *

The Atlas-Imperial Engine Company's factory at Oakland, California has been enlarged by the addition of an erecting and test building 100 by 150 feet. This gives an additional floor space of 150,000 square feet, which was badly needed in view of the increased production of power units by the shops. The new gas engine shop is already too crowded to handle satisfactorily the increasing demands of buyers who are eager to have reliable engines. While a Pacific Marine Review representative was in the shop recently he viewed on the testing block the new engine for the Richfield Oil Company's new tanker now building at the San Francisco works of Bethlehem Shipbuilding Corporation. This is a 6-cylinder, 250-horsepower unit and runs like the proverbial watch. An exceptionally fine casting for the subbase of the engine was being machined at the time, and from an old hand's point of view it was a splendid job, about as near perfection as anything of the kind could be. The Atlas works are building a 6-cylinder, 170-horsepower diesel engine which is to go into an Australian hull. Our cousins in the antipodes seem aware of the fact that a good engine is a good investment.

* * *

Atlas-Imperial Engine Company, Oakland, are busy on many new orders for engines. Sizes from 50 to 400 horsepower in diesel engines and from 6 to 45 horsepower in gas motors are being turned out. Listing a few of the first group there are:

Two 400-horsepower engines for the Shaver Transportation Co., Portland, Oregon.

One 125-horsepower diesel engine for the International Fish Company, San Francisco, to replace one previously installed by another firm;

Two 90-horsepower diesel engines to be built into the Falcon and Chignik for the Alaska Packers' Association;

Four engines have already been shipped to the Wallace Fisheries Company, Vancouver, B. C., these being a part of an order for eleven sets, of which there are five of 75 horsepower, two of 125 horsepower, and four of 50 horsepower;

F. E. Booth Company's new fishing boat will take a 125 horsepower diesel;

One of 125 horsepower has been shipped to Sydney, Australia;

A 120-horsepower diesel was recently installed in John Barrymore's yacht Mariner;

A 110-horsepower diesel was recently shipped to Burma, Lower, where it will propel a 90-foot freight boat on the waters of the Rangoon district;

A direct reversible diesel engine of 170-horsepower is also being built for the new deep-sea fishing boat for Frank Mitchell, under construction at Robbins' Yard, San Diego;

A 200-horsepower diesel engine was shipper recently to Tepic, Mexico;

The River Sand & Gravel Company are taking out the gas engine of their workboat Paul Martin and having a 65-horsepower diesel installed;

The Petaluma and Santa Rosa Railroad Co. will have a 110-horsepower diesel engine installed in their workboat Golden Eagle, replacing a gas engine;

The yacht Cleopatra will have a 75-horsepower diesel engine in place of 50-horsepower gas engine.

Among the foreign shipments are a 12-horsepower gas engine to Colombo, Ceylon, which will be installed in one of the Motor Launch Company's taxi-workboats, making fourteen they now operate. Greece also is on the list of consumers of Atlas products, many of the 8-horsepower gas type being shipped to that far distant place. The Greek fishermen on the Pacific Coast write to their folks at home about the Atlas engine, and orders naturally follow.

In addition to marine work, Atlas-Imperial Engine Company have delivered twenty-five diesels of 75-horsepower each to the Bucyrus Company of San Francisco for land work.

* * *

Western Machinery Company, San Francisco Works, report shops fully employed turning out their well-known Western-Enterprise diesel engines. Sales during the past month were very satisfactory, including deliveries to local and foreign owners.

* * *

Hicks Engine Works of San Francisco report business good, with prospects for more orders soon. At the present time the shops are running full. Four new engines, were recently sent to Anderson & Cristofani's Yard at Hunter's Point, San Francisco, for installation in fishing boats for Monterey Bay. These are two 3-cylinder 15-horsepower units, one 2-cylinder 12-horsepower, and one 2-cylinder 10-horsepower. They also shipped nine 6-horsepower units to Astoria, Oregon, where they will be used in salmon fishing boats at that port.

* * *

The Pacific Coast Engineering Company, Oakland, California, recently launched a large steel barge. This was built for Libby, McNeill & Libby for use in transporting pineapples to Honolulu from the various plantations in the Hawaiian Islands. The barge is 130 feet long, 40 beam, 9 feet depth, and has a capacity of 1000 tons of pineapples. The cost was $45,000.

* * *

Worm Gear for Capstans

WE note with interest an application of the modern speed reduction methods in securing the desired revolutions on the capstan of a Mississippi river boat. This outfit was developed by the Laclede Iron Works of St. Louis, Missouri, and is known as The Laclede Iron Works Patented Capstan, used for raising and lowering the anchor or lightening up on guy ropes. A wide range of speed on the capstan and positive control by the operator are features which make this a valuable piece of equipment in the handling of vessels.

Motor power is supplied by an electric motor of standard design, direct connected through a flexible coupling to the high speed shaft of a Foote Bros. IXL vertical worm gear speed reducer. This reducer is of the standard design recently developed by Foote Bros. and largely used for drives of agitators and mixers and stirring equipment. Ball thrust bearings are provided at either end to absorb the end thrust and the worm gear, of English worm gear bronze, is also provided with ball thrust bearings to take up upward and downward thrusts. The worm gear is rigidly keyed to the slow speed shaft which in turn is directly connected through a flexible coupling to the vertical drive shaft of the capstan.

An electrical controller of the type used on electric street railway cars provides for a wide range of speed by cutting in or out sections of the grid resistance shown in the illustration.

Auxiliaries—Ship Supplies—Marine Equipment

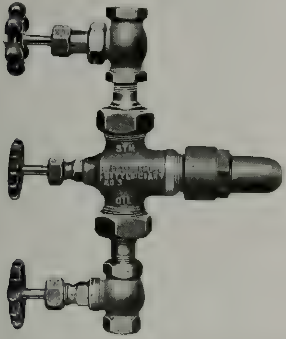
An Interesting Line of Steam Specialties

By W. P. Lindley.

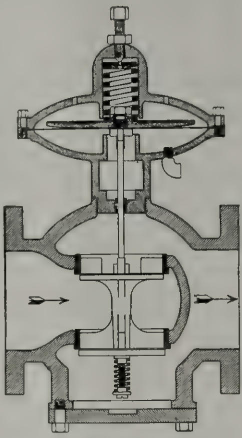
REGULATING valves became a necessity when the higher steam pressure came into use. Many were the kinds and types made. Some depended on weights and levers to produce the result desired, others had diaphgrams. These latter were varied, also; some had metal and others fibrous or rubber formed to function in the way wished. But many of them refused to do what, theoretically and in the drawings, they were supposed to do. Defects in material were one reason for this; defects in design another. The operator, too, was often responsible, for attention was not given to the reason why a reducing valve does so.

The G. E. Witt Co., Inc., some years ago evolved a reducing valve that really reduced and kept on reducing, though at times subjected to brutal treatment and severe strains. Few, if any, of them ever fell down on the job. The writer of this article personally knows where a Witt valve had been installed in a very out of the way place, up over a boiler in the heat and dust. Seldom or never looked at, it steadily did its work. After a long time of service, it one day stuck, having become so fouled by scale and dirt carried over by the steam that the poor thing was almost blocked. At that time a man was in charge who knew little and cared less of what really happens in a reducing valve when functioning properly, so he at once hit it with a hammer, believing this the quickest way to effect repairs. And strange to say, the valve started to work again. This shows that it must have been well built in the beginning, with a proper design to start on, or no such service could have been had.

The writer was told about the incident, having at the time some authority over the machinery of which this valve was a part, had it taken out and cleaned up. When this was done the unit took up its load and, at last accounts, was still on the job and going all right. The simplicity of this valve is what makes it able to stand up.



The G. E. Witt Company's improved Little Giant fuel oil burner for kiln or bake oven service.



The G. E. Witt pressure reducing valve.

As will be seen by the drawing herewith, there are few moving parts. It is readily accessible to make re- There are no glands to stick or leak. pairs, and, above all, it is constructed of good material so disposed as to insure strength and service. The action of the valve is plain to the engineer who looks at the drawing.

Besides steam reducing valves, the G. E. Witt Co., Inc., manufacture others to handle liquids, gas, or air. Pump governors, too, are made by them, and most of the old time marine engineers will recognize as an old friend the Witt oil fuel pump governor. Safety governors to automatically control speed of pumps, should discharge pipe break or any valve on line be accidentally opened, are another of the many Witt appliances. Fuel oil flow control valves and automatic boiler feed regulators, which do keep the feed supply constant and at the proper level, are also made. And it is obvious that the G. E. Witt fuel oil burner is equally well made, for thousands of them are in use in plants all over the country.

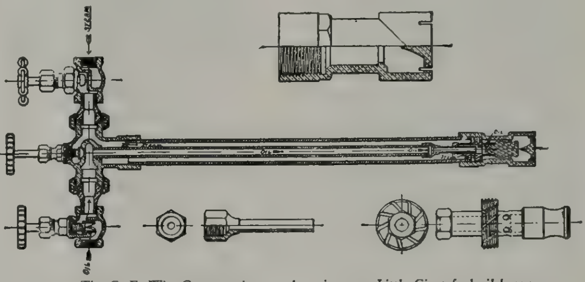
The fuel oil burners are made to project the oil fire in any required direction, vertical, horizontal, at any angle or position, and they have a wide range of load. They are made both inside and outside mixer type, using compressed air or steam as an automizing medium. They are also constructed in back-shot or straight kinds, and to develop from 1 to 300 horsepower, if for steam generation, or to burn from 1 to 100 gallons of fuel per hour when used for kiln purposes.

A glance at the sketch will show the good design of these units.

Complete and valuable information is embodied in the firm's Catalog No. 10, and C. W. Vaughn, president of the company, will supply copies of them to those interested. This gentleman, having been associated with the Witt Company for many years, can take up and solve problems requiring practical and technical knowledge of subjects pertaining to the application of the goods he makes. It might not be out of the way to mention that the Pacific Gas & Electric Company used great numbers of the Witt valves and other supplies in their distribution of heat from central steam stations. This shows that Witt goods are good. Another factor is that they are made in San Francisco and spare parts or duplicate units can be easily obtained. A most complete factory is steadily employed turning out stock, the utmost care and precision as to workmanship and metal mixes being insisted on by the management.

Trade Literature

The selection and application of centrifugal pumps to mine pumping is the subject of a 20-page leaflet distributed by the **De Laval Steam Turbine Co.** of Trenton, N. J. Instructions are given for the design of piping and the calculation of friction head power required. Details of construction which should be looked into when selecting pumps for this service are also discussed at length. This publication should be useful not only to mine owners and engineers, but to anyone using pumps for irrigation, general water supply, and similar service.



The G. E. Witt Company improved marine type Little Giant fuel oil burner.

Navigating Instruments for Three Generations

THE work of manufacture, repair, and adjustment of navigating instruments is more than a trade—it is an art. It requires, besides a trained hand and eye, the most delicate sense of proportion and a knowledge of variations in metals under different climatic conditions. The art is one which is usually handed on from father to son, and in this particular San Francisco can rightfully be proud of the fact that in that city is a firm of nautical instrument makers that has an active membership of three generations of one family.

This firm is that of the Louis Weule Company, 6 California street. The business was first established by the late Charles Pace, an Englishman, who started as a chronometer and nautical instrument repairer in 1852. In the late sixties Louis Weule became associated with Mr. Pace. The latter retired in 1892, and Mr. Weule became head of the firm. It was handled by him alone, though his sons were beginning even at that time to absorb some of the finer points of the profession. In 1902 Emil Ging joined the Weules and has been actively engaged with them since that time. In 1906 the business was made a co-partnership, with Louis Weule as head. With him were his two sons, Ernest L. and Arthur F. H., and Emil Ging. Today this quartette of skilled artists are aided by Harold Weule, son of Ernest. So there is the remarkable fact of three generations all active simultaneously in one particular firm, and all of them experts.

Besides the store at 6 California Street, there is a factory and shop at 119 Steuart street, where heavier jobs are handled. Here the world-known Weule motor sounding machines are built. The same exactitude of mechanical fineness is observed in their construction as is employed in the chronometers turned out by the firm. The simplicity and ability of Weule's sounding machine to stand up under rough usage is well known to nautical men. By this machine one man can take deep sea soundings, where three would be required with a hand operated machine and a dozen for the old lead method, now practically obsolete. In three minutes one man can get correct readings of the depth of the water, where from a quarter to a half-hour would be taken by hand machine operation. So electricity is made to serve in the business of "heaving the lead," a romantic feature of the old sailing ship days.

Besides sounding machines, the factory on Steuart Street turns out binnacles, azimuths, compasses, and other larger instruments. The finer and lighter work on chronometers, sextants, clocks, optical glasses, and other aids to navigation is done at the uptown office. Here also are always kept on hand the latest charts and books on navigation. Many aids to correct chart work are handled, and the expert navigator can find everything he needs in his work at Weule's store. Ship's chronometers are adjusted and rated there. And this in itself is a fine and particular art. For chronometers, like the ladies, are temperamental, and require great patience and skill to make them function exactly. When it is known that an error of a few seconds in the time-keeping quality of a ship's chronometer means an error of her position in many miles, the need of absolute exactness is apparent. This exactness of adjustment is only gained by the highest skill. A skill which, as before said, is an art.

Westinghouse Organization Changes

RECENTLY there was effected a consolidation of the sales organization of Westinghouse Electric and Manufacturing Company, whereby the marine sales department was made a section under the Transportation Sales Department. This action is in line with modern trends of thought and organization, the vessel at sea being now rightly considered merely a link in the chain of world wide commercial distribution.

M. B. Lambert, sales manager, Transportation Department, Westinghouse Electric and Manufacturing Company.

G. H. Froebel, Central Station Sales Manager, Westinghouse Electric and Manufacturing Company

In making this change, G. H. Froebel, formerly sales manager for the marine department, was promoted to be Central Station Sales Manager, and the transportation sales, both shoreside and marine, come under M. B. Lambert, sales manager of Transportation Department.

It is interesting to note that both of these men have had to support themselves from early boyhood. Froebel is from Texas, Lambert from Long Island. Froebel worked his way through two years of college and then went into full time engineering work. Lambert, since the age of fourteen, has worked full time and gotten his education on the side. Both have been through the practical grind of hard work and both have shown executive and organizational ability of high order.

The marine sales division of the Transportation Sales Department will function smoothly and will be backed up by the same engineering ability and service that have always characterized the Westinghouse organization. The vigorous personality of G. H. Froebel will put new enthusiasm into the Central Station sales.

Bitumastic Protects Decks

FIFTEEN years ago the Associated Oil Company's steamer Coalinga was built at the Moore Dry Dock Company, Oakland. Her decks were then coated with bitumastic enamel. In a recent overhaul of the vessel the enamel was removed for careful examination of the steel decks. It was anticipated that repairs would be extensive, owing to the fact that practically nothing had been done to these decks beyond the original coating during the many years. However, when the bitumastic enamel was chipped off, it was found that but 5 per cent of the surface was in any way deteriorated. This shows what a wonderful preservative bitumastic enamel is, even under the most severe conditions.

The Wailes-Dove-Hermiston Company, San Francisco distributors, are advised by their headquarters that the compounds as applied today are even better than older stuff. This is due to the progress in research and improvements in manufacture. The heads of the firm believe in a continual betterment of products, with obvious advantages to customers therefrom.

Trade Literature

The Uehling Instrument Co. 473 Getty Ave., Patterson, New Jersey, are distributing a new catalog, No. 150, covering their combined barometer and vacuum recorder for use with steam turbines. This instrument records the absolute back pressure of the turbine exhaust; that is, the true vacuum corrected for barometric changes. The importance of this reading is apparent when it is considered that a drop of one inch of mercury in the turbine's back pressure necessitates an increased steam consumption of 5 to 15 per cent per kilowatt-hour produced, depending upon the existing back pressure and the type of turbine. High accuracy is claimed for the instrument because of the mercury column principle employed. Great legibility and sensitiveness are secured by recording only the working part of the range (either 25 to 31 inches or 20 to 31 inches of mercury) over nearly the full face of the chart. The bulletin includes valuable turbine performance data, a list of users, typical charts, sectional views, and dimension diagrams, including reference to a new model instrument for flush mounting on panel boards.

Marine Electrical Maintenance Service

ALMOST everyone along the waterfront of San Francisco knows Charlie Dahl. Many of the ship folks from across the water who make this a port of call are also numbered among his friends. For twenty-six years he has been doing business in the electric supply, construction, and repair line, specializing on the marine trade, and has established for himself and the firm which he founded a splendid reputation for integrity and for reliable workmanship. This reputation has been achieved through personal attention to business and through fair dealing and reasonable profits.

Charles W. Dahl was born in Sweden. In that country he served his apprenticeship, learning the trade of practical machinist and electrician. At the age of nineteen he came to the Pacific Coast and for a number of years worked at his trade at the old Union Iron Works, San Francisco, later serving as an engineer officer aboard the cruiser Charleston.

During this naval experience Mr. Dahl took a very creditable part in the famous international incident of the attempted smuggling of arms into Chile by the steamer Itata, which was captured by the Charleston in the harbor of Iquique. Mr. Dahl was placed in charge of the engine room of the Itata on the voyage of that prize to San Francisco. All of this happened in 1890.

Charles W. Dahl returning from one of his many successful hunting trips.

In 1900 Charles W. Dahl started in San Francisco in the business which now bears his name and which has had a steady growth since that time. While he is still active on the San Francisco Embarcadero and is continually making profitable contacts for his business, the active control of the shop and store is very largely in the hands of his son, C. A. Dahl. Fishing and hunting trips are hobbies with Charles W. Dahl and he owns a neat cruiser in which he takes great pride and with which he manages to keep well supplied his own larder and those of many of his friends.

A corner in the San Francisco shop of the Charles W. Dahl & Son Electrical Company.

Charles W. Dahl & Son Electric Company carry a full line of marine electric supplies for meeting the lighting and power requirements of modern freight and passenger steamers. The firm maintains a well equipped shop designed for handling repairs to electric motors, searchlights, marine fixtures and fittings, and all applications of electricity on shipboard.

An Efficient Refractory for High Pressure Modern Furnace Conditions

CHANGES in the practice of combuston in industrial and marine furnaces have brought many problems to the designer of steam generators and to the engineering organizations of the manufacturers of refractories. The modern trend in combustion carries the furnace to operation at two to three hundred per cent of nominal rating, causing temperatures at parts of the furnace wall that are almost destructive to ordinary fire brick. The action of such temperatures causes unequal expansion and working of the bricks on each other and the crumbling and falling out of the fire clay used in the mortar between the bricks.

The most modern development in steam boiler furnaces is that which results from the use of powdered coal as fuel. This requires tremendous furnace volume and walls of refractories reaching to much greater heights than in ordinary hard coal or oil practice. In consequence of this great height of furnace wall, there is much greater compression load on the fire brick lining and a tendency to bulge and shear at the bonding courses.

To meet these furnace requirements, Betson's plastic fire brick has been developed.

Betson's plastic fire brick is a bulk compound of the highest grade refractories properly proportioned so as to eliminate expansion and contraction. The formula for its manufacture is based on long scientific study, experiment, and development and on much practical experience in mixing and handling refractory material. It has been used for many years by representative plants in all types of water-tube and fire-tube boilers and for practically all types of settings, and has been found particularly adaptable to high service boilers operated at high ratings continuously. This material comes in barrels in a stiff, plastic condition. It is laid up on the furnace walls in a continuous coating of the desired thickness, hammered into place with a mallet, and kilned in place with a slow fire. Once having hardened in place it lasts for many years, even under very trying service conditions.

Plastic fire brick, as supplied by Betson Plastic Fire Brick Company, is particularly easy to repair and is very economical on maintenance charges. It produces practically an air-tight furnace and therefore a very much higher over-all efficiency of boiler and boiler setting.

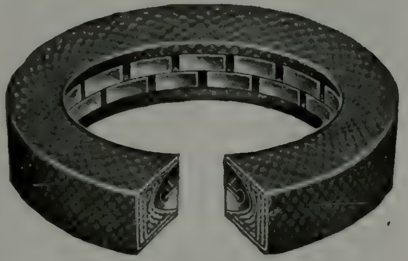
The Plant Rubber and Asbestos Works of San Francisco are California distributors for Betson's plastic fire brick.

The purchasing department of the McCormick lumber mills and steamship interests in the Columbia river district has been centralized at Portland, Oregon, under the direction of J. A. McTarnighan. Purchases of materials and supplies of the McCormick interests on the Columbia river are said to total more than $15,000,000 a year.

New Jersey Asbestos In San Francisco

An Interesting Interview with H. S. Fitz Gibbon, President and General Manager of the New Jersey Asbestos Company

SOMETIMES a business is established by a queer quirk in the construction of a machine or article. Such happened when the New Jersey Asbestos Company started. In 1892 the manufacture of storage batteries was a new thing and a Philadelphia firm began to make electric storage boxes, which are now in almost universal use. In their manufacture an asbestos cloth was necessary. Bids were asked for the delivery of a few tons per year, and the men who later became the heads of The New Jersey Asbestos Company placed a bid which was accepted.



"V" Pilot piston rod packing.

A factory was established at Philadelphia, and a fine start made. For a time all went well and the new firm did considerable business. However, it was found that another material would serve better than the asbestos product. No further contracts were to be had, and the asbestos cloth makers found themselves with a perfectly good factory on their hands but no market for its output. Considerable stock had been made up and things looked a total loss. The making of asbestos cloth alone was abandoned, and in its stead was substituted the making of steam packings.

At first sheet wire woven asbestos packing was produced. Later the now world famous Gladiator asbestos metallic gasket, familiar to every steam engineer, was evolved. In fact, so universal became the use of these gaskets that the word asbestos was seldom used, the name Gladiator being considered sufficient.

Finding a ready market for this line, the company branched out in the making of all sorts of steam packings, putting in them the same good quality and workmanship that had made a good reputation for the name Gladiator.

Improvements followed, and one of their latest productions is the "V" Pilot piston rod packing, an illustration of a ring of it herewith shows how well it is designed. The inside metal sections are not such, although they so appear. They are a solid metallic bar, so formed that each little part breaks joints with the one in the next row. This results in an ideal mechanically arranged packing. The small interstices fill with lubricant, these tiny reservoirs aiding to prevent leaking, owing to the labyrinth form. Then the whole metal is surrounded with an asbestos rubber fabric, strong, heat resisting and resilient, the whole making a packing that combines the best attributes possible in that type.

Besides the manufacture of packing, the New Jersey Asbestos Company are the sole agents in the United States and its possessions for the well known Woodite products. This material originated in England and for many years the manufacture has been restricted to Great Britain. As a material for the packing rings of pump pistons it is believed to be about the best that can be obtained. It is slightly flexible, very tough, takes a fine surface under friction, does not expand under heat, and wears so slightly that its life in service is long, even under adverse conditions. Woodite is made under the most stringent secrecy, and any attempts to obtain the formula for mixing have been met with refusal by the holders of the basic idea. The writer well remembers when Woodite rings for water glasses first came on the market. They were hard to get, and every chief engineer was anxious to obtain them, as once a glass was packed with them all troubles from leaks or erosion of glass ends were over. As steam pressures rose in boiler construction, so did the use of Woodite rings increase, and before long no efficient engineer would be without them.

Of course the later introduction of diesel engines caused some idea that the use of packing would be discontinued. The opposite, however, has happened. There is a good deal of packing around a diesel, but it has to be of the very best to stand the high heats. The New Jersey Asbestos Company have set their engineers and chemical experts at work on the problem, and it is believed that the firm will soon put on the market something that will stand as high with the deisel engineer as the present products now stand with the steam men.

H. S. Fitz Gibbon, president and general manager, New Jersey Asbestos Company.

It might be of interest to know that on the site of the first factory of the New Jersey Asbestos Company, operated in Camden, New Jersey, is now located the great works of the Victor Talking Machine Company, which, with its Dog "who knows his Master's Voice" is known in every part of the world.

After the sale of the original plant the company's works were moved to Sea Cliff, New York, and modern up-to-date machinery was installed in a three story building, adjacent to which are the rubber department, machine shop, garage, and warehouse.

The interests of the company are in the hands of Squires and Jones of San Francisco who are covering the State of California and the Hawaiian Islands as well as territory adjacent thereto. Their offices are located at 37 Spear Street, San Francisco, where a full and complete line of stock is carried.

A Handy Soldering Iron

THE General Electric Company is now marketing a new soldering iron of light construction, designed to heat up quickly. This iron is made in standard sizes ranging from ½ to 1¼-inch tip.

Power consumption ranges from 70 watts for the smaller iron, for light and intermittent use, to 350 watts for the larger size on heavy duty. The irons for heavy duty are provided with radiating stands for the purpose of maintaining the iron at the correct operating temperature when temporarily not in use. The rapid rate of initial heating is brought about by unusually good heat conduction between the heating element and the copper tip. Heat from the tip is prevented from reaching the handle by means of a special mechanical construction between the two, this being in the form of a spiral made from a steel rod . This also provides a rigid connection between the handle and tip.

Instead of mica, usually used for an electrical insulator in the heating unit of soldering irons of this type, the heating unit has an insulating powder so highly compressed that it becomes a good heat conductor and will withstand temperatures of more than 2000 degrees Fahrenheit.

Marine Insurance

Developments of the Month

By CHARLES F. HOWELL, Contributing Editor

SUMMARY

- -

Insurable Interest

Liabilities under "Franchise"

Insurance of Goods on Trucks

Adjusting Ocean Losses

New Light on the "Inchmaree Clause"

Latent Defects

Auxiliary Vessels as Risks

Full Coverage while Building

READ AND LEARN

INSURANCE policies insure the assured but not the thing. It is well to bear this distinction in mind and to remember that to have a contract of insurance valid an insurable interest must exist in the person with relation to the thing. This matter of "insurable interest" is highly important; it must exist to enable a person to enter into a marine insurance contract. The precise scope of this influence has been described as that of one wherein the relation of the applicant to the goods, in connection with which insurance is desired, in such that he will be benefited by their continued existence or be prejudiced by their loss or damage. This may sometimes be a remote interest, such as that of an agent whose commission depends upon the safe delivery of goods at destination; or it may be extreme and direct, as that of the owner himself. Between these extremes are to be found numerous degrees of interest, any of which may constitute a valid insurable one. The chief thing to remember is that some such an interest, greater or less, must exist before the marine insurance may be validly consummated.

The Franchise

Expected fortuitous losses are barred out of the policy by the franchise in the average clause. It is sometimes expressed as a percentage, sometimes as a named sum, which must be reached before liability attaches under the policy. The clause in common use reads, "Free of particular average unless amounting to five per cent (5%)." The 5% is the franchise. In a word, it is the intent of the provision that no partial loss resulting from an insured peril is to be paid unless it equals or exceeds 5% of the insured value. When it does, the underwriter is liable for the entire loss.

There is another form of the "franchise," which is styled deductible. The clause containing it reads, "Free of particular average, unless amounting to five per cent (5%), which is deductible." This means that only such part of the loss as exceeds the 5% franchise is payable.

The franchise in the average clause applies to the value of the entire shipment in case there are no modifying words to the contrary. But it is customary to apply the franchise to a lesser unit than the entire shipment, because the latter is often very considerable in value; in which event the unit is based on the susceptibility of the goods to damage, and becomes possibly each shipping package, or each 25 bags, or each lot of certain marks, or by employing the dollar as a unit, each amount of $5000 or $10,000. The result of the use of the franchise is to materially reduce the amount necessary to make a claim, to greatly increase the liability of the underwriter, and to substantially advance the rate of premium.

For some time past, Pacific Marine Review has been shaping its editorial policy with a view to a fuller coverage of the marine material which more directly fits into the name of this magazine. We feel that our special sphere is the Pacific and that we are strategically placed at San Francisco to interpret Pacific Ocean maritime movements and policy for the ship-minded population of the United States in particular and of the English speaking world in general.

In line with this policy and beginning with the June issue, we have made arrangements to have the Marime Insurance department edited by a prominent authority in marine underwriting and adjusting who is in constant touch with this phase of marine activity in San Francisco, the center of marine underwriting for the Pacific Ocean.

We would appreciate from our readers comments and constructive criticism on the material appearing in this department.

Motor Car Insurance

There is a steady increase in the demand for insurance of goods carried by motor trucks, probably because of the rapid extension of the use of this means of short-haul deliveries in view of the speed to be had. Indeed, the need for the insurance of motor cargoes grows out of that very speed; the rush to keep on schedule weakens the heavy cars, presses them into service in all weather and by day as well as night, subjects them to collision and overturning, saps the strength of the bridges along the way—many of which were never intended for such heavy use, having been built before motor trucks were invented—and lays them open to the fire hazards that lurk within the truck itself as well as in the garages.

The extent of the coverage may be undersood from the language of the modern motor cargo policy, thus: "Loss and/or damage caused only by fire, including self-ignition and internal explosion, and/or upset and/or collosion with any other motor truck, vehicle or object, and/or lightning, cyclone, or tornado; also for loss caused by collapse of bridges or docks and/or rising navigable waters or river floods. To cover also stranding, sinking, burning, or collision while on board motor trucks being transported on any regular ferry line, including general average and salvage charges for which the assured shall be legally liable."

Some of the forms under which motor cargo insurance is written are as follows:

Trip Form: Used in covering the owner of household furniture or merchandise who is making a shipment, usually on a rented truck; also used in connection with shipments by rail under released bill of lading. Theft of an entire truckload of household furniture may be covered for an adtional premium; as also the theft of entire shipping cases of general merchandise.

Owner's Form: Used by manufac-

North British and Mercantile Insurance Company, Ltd.
The Commonwealth Insurance Company, of New York
PARROTT & CO., Pacific Coast Marine Agents
320 California Street E. L. BARRY, Manager SAN FRANCISCO

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA and SANSOME

JOSEPH HADLEY,
European Agent
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turers, merchants, etc., who are regularly shipping their products on their own or on hired trucks. It is written for one year. The assured specifies the trucks used and the amount of insurance on each truck. When the specified trucks are laid up for repairs, there is the privilege of substituting others if prompt notice is served the company and additional paid, should it be required.

Truckman's Form: Used by truckmen to insure their legal liability for goods carried by them; also the owner's interest. The forms mentioned above do not release the truckman himself from liability, and unless he takes care to cover his responsibility he may have to pay for the losses sustained under the Trip or the Owner's policies.

Still another important thing to remember is to keep fully insured. The policy reads: "In case of loss, this company shall be liable for no greater proportion thereof than the amount of insurance specified herein on goods and/or merchandise on board the motor truck involved in the disaster bears to the total value of all the goods and/or merchandise on board the said truck at the time of the disaster."

Each risk is rated separately, and according to the particular hazards involved. Shippers using hired trucks are not safe in depending upon the truckman's presumed insurance. It may be non-existent or insufficient.

Adjusting Marine Losses

Ocean cargo business is the backbone of marine insurance. How losses are adjusted in that line may prove of interest, especially as marine adjustments differ materially from those in fire insurance and other branches. The usual ocean cargo policy is a valued contract and the amount insured fixes the underwriter's liability in cases of claims for damage, partial loss, or total loss. The amount of the insurance is not limited to the cost or market value of the goods, but may be fixed at any reasonable amount exceeding such values.

The adjustment of a total loss is comparatively simple, it being necessary for claimants to produce the shipping documents, including evidence that vessel or goods have been lost by a peril insured against. Details of the circumstances attending the loss are generally given by the survivors in what is known as a "protest", when the ship herself is lost. The amount insured must be paid by the underwriters. In the case of partial losses resultant from an insured peril, the in- to whether they should be held for the replacement of the part in which voice is made the basis for apportioning respective values, and the insurance company is liable for the proportionate insured value. The insured value less the proceeds of sale represents the liability of underwriters where merchandise has been sold short of destination in damaged condition.

"When goods arrive at destination in a damaged condition," observers Assistant Manager H. E. Reed, of the Atlantic Marine Department of the Fireman's Fund, "it is customary, and in fact necessary, for consignees to notify the company insuring them, or their settling agents, of the loss, and surveyors are then appointed. In such cases the methods of adjustment differ from those obtaining in other lines of insurance because it is customary to first endeavor to agree on a **percentage of damage** sustained without regard to the value of the property, it being left for the company to figure out the amount payable in accordance with terms of the policy. If no arrangement can be reached as to the percentage of damage, then it is customary for the goods to be sold at public auction, always, however, for account of the owners rather than for the insurance company. Under these conditions the method of determining the amount payable is to arrive at the percentage of loss, and this is done by comparing the price which the goods would have brought had they been sound, with the amount which they produced at auction; and the claimant is entitled to the percentage so arrived at, based on the insured value of the articles damaged, to which is added the necessary expenses of auction."

As a rule, the duty and freight payable at destination are also insured. In the majority of cases no refund is obtainable, and then the underwriters pay the same percentage of loss on duty and freight as on the goods themselves. Where reconditioning can be done to the satisfaction of all concerned, the expenses involved in the work are met in full by the underwriters.

"Latent Defects"

Under what is known is the "Inchmaree clause" the liability of underwriters is defined as regards damage arising through latent defects, but during the last few weeks there has been considerable discussion both in this country and in Great Britain as the defect exists. The Institute of London Underwriters, as a result of this controversy, has just passed a resolution of the effect that underwriters are not liable for the replacement of an article containing a latent defect when the development into a patent defect is due solely to ordinary use or ordinary wear and tear.

It has been insisted by some, of late, that parts in which defects are discovered are replaceable under the marine policy. At one time this was the practice in British underwriting, but it was due to a misunderstanding of the intention of the framers of the "Inchmaree clause." Since then legal decisions have made it clear that only in the event of a part in which a latent defect exists being damaged by an accident caused by a peril insured against, are the underwriters liable for the replacement of that part.

To have the history of this contention clear in mind it may be explained that for many years after the introduction of steam engines as the motive power of vessels, there was doubt as to whether or not the general words in the policy form reading "and all other perils, losses, and misfortunes that have or shall come to the hurt, detriment, or damage of the said vessel, or any thereof," would include losses caused by the bursting of boilers or other losses occasioned through accident to the machinery of the vessel. The steamer Inchmaree, about that time, sustained damage through the breaking of the air chamber of a pump operated by a donkey engine, apparently through the negligence of the crew. In order to settle the disputed subject a test case was made of the Inchmaree's casualty and the whole affair was threshed out before the House of Lords. The unanimous decision was that such a loss was not occasioned by a cause of the same nature as a "peril of the sea," and it was held that the underwriters were not liable. Thereupon it was decided by underwriters that they would arrange for coverage to shipowners against loss from casualties of this nature, and the "Inchmaree clause" was drafted and introduced into hull policies. This clause reads as follows:

"This insurance also specially to cover (subject to the free of average warranty) loss of, or damage to hull or machinery, through degligence of

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LOS ANGELES

CHARLES R. PAGE, Manager
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

309 COLMAN BUILDING, SEATTLE, WASHINGTON

master, charterers, mariners, engineers, or pilots, or through explosions, bursting of boilers, breakage of shafts, or through any latent defect in the machinery or hull, provided such a loss or damage has not resulted from want of due diligence by the owners of the ship, or any of them, or by the manager. Masters, mates, engineers, pilots, or crew not to be considered as part owners within the meaning of this clause should they hold shares in the steamer."

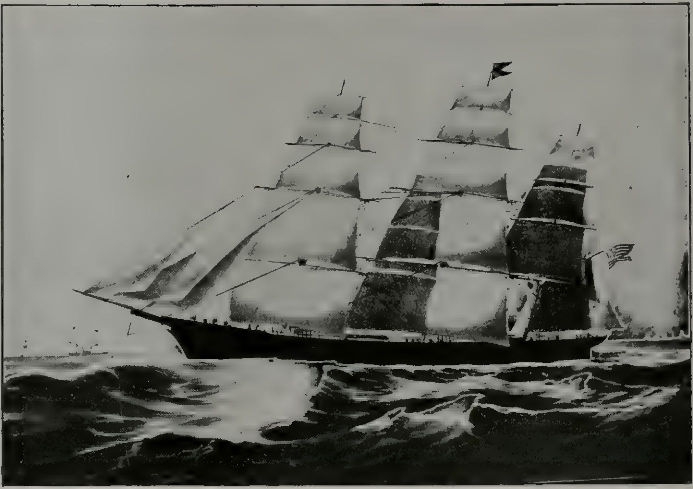
Auxiliary Vessels Poor Risks

Two many factors are involved in the classification of motorships to make the problem a simple one. As between motorships of various types, there is much more divergence in the problems involved than there is among steamers. Hugo Hammar, one of the foremost Scandinavian underwriting authorities, recently observed that while on the one hand a thoroughly up-to-date steel vessel with a four-cycle diesel engine, built by a first-class firm, involves even a smaller risk than a modern steamer, on the other hand a wooden ship—especially a fairly old one—with a hotbulb motor, may be the greatest and most dangerous risk afloat and one that can in no way be compared to a wooden steamer. These statements are based on investigations made of accidents and on statistics of casualties. Most of the losses sustained by such vessels are due to leaks, which cannot be attributed to any other cause but that their hulls are not fit to stand the strain exerted by the engines.

Writing Builder's Risks

Despite the recently adopted clause of the London Institute, to which we alluded in last month's issue, whereby the full contract value is made the basis of insurance in builder's risks, it appears that many British underwriters still make use of the old and discredited installment method of valuation. It is feared that this is being done in order to be in position to take a slash at the rates when opportunity presents. Prior to 1918 British underwriters made exclusive use of the installment idea. American underwriters had abandoned it some while before. The installment idea is based on a comparatively small valuation at the inception of the risk—that is, at the laying of the keel, when there is next to nothing of the future vessel in existence as yet—the values being made to increase as the construction work advanced, with additional premiums for each increase in value, until the full amount to be insured has been reached.

Under the new contract value system, the premium is paid on the full contract value at the inception of the risk. Because of the abuses which attended the old installment system it was abandoned in the United States several years ago. The present American form makes the risk attach from the date of the laying of the keel, premium being charged from that date on the total amount for which the underwriters would be liable in event of the vessel becoming a total loss after completion, but before delivery. Up to the time the ship is launched there is practically no actual marine hazard, the protection being purely a shore cover. Underwriters are liable for the hazards of launching and the breakage of the ways.



Sovereign of the Seas.

Freights, Charters, Sales

April 14, 1926.

SINCE our last report dated March 16, there has been no revival in grain to the Orient. The United Kingdom has come in during the past ten days and some five or six steamers have been closed from 23/- to 27/6. Owing to a return of barley business, the liners have obtained from 27/6 to 30/-for May/June but we doubt if higher rates will prevail considering the amount of tramp tonnage in the market.

Lumber to Australia is dull with a few fixtures reported to cover old commitments and rates are nominally $13 to $13.50.

Japan is buying lumber at present prices and although charterers were indicating $8.50 to $9 for April/May, they have paid $9.50 to $10.

The West Coast of South America is not taking tramp tonnage as the new East Coast of South America Lines. being unable to obtain complete car-

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Phone Douglas 6313

PACIFIC MARINE REVIEW
Leads Its Field in—Editorial Coverage—Circulation—Advertising

goes, have been accepting lumber to West Coast ports. Rates by liners are quoted at $12.50 to $13.

The intercoastal lumber market remains dull with the Atlantic seaboard still trying to unload the large amount of unsold lumber discharged during the winter.

The following steamers are reported fixed with grain to the United Kingdom/Continent: British steamer Benmohr, 23/0, April/May, Dreyfuss & Company; Norwegian steamer Kari Skogland, Ireland, 27/6; British steamer Benlomond, 26/3, option Portland or Puget Sound, 27/6, Wilmer Grain Company; British steamer Dalemoor, 25/3, April, Strauss & Company, option Portland 26/-; British steamer Holms Light, 25/-, May, Strauss & Company.

The Japanese steamer Seine Maru has been taken for lumber from Coos Bay to Shanghai by Mitsui & Company.

The following lumber fixtures to Australia by J. J. Moore & Company, Inc. are reported: Italian steamer Kobe, April loading; Belgian steamer Wolhandel, same; Italian steamer Angiolina R, June; British steamer General Smuts, April.

The following steamers are reported fixed with lumber to the Orient: British steamer Norman Monarch, W. L. Comyn and Company; British steamer British Monarch, April, Canadian Transport Company, Ltd.; Japanese steamer Koyo Maru, $10, Mitsui & Company; Japanese steamer Florida Maru, May, charterers not mentioned.

The Norwegian steamer Key West is reported fixed from Columbia River, British Columbia and Grays Harbor to the West Coast of South America with lumber by General Steamship Company.

J. J. Moore & Company, Inc. have taken the Danish motorship Nicoline Maersk for South Africa, July/August loading.

The Belgian steamer Elzasier is reported fixed with lumber from Vancouver to North of Hatteras, May loading, by W. L. Comyn & Company and the British steamer Domira from Puget Sound to Cuba, April loading, by McCormick Steamship Co.

The following steamers are reported taken on time charter: British steamer Bretwalda, British Columbia to North of Hatteras, $1.35, delivery British Columbia, April/May; British steamer Sheafmont, British Columbia to North of Hatteras, lumber, delivery British Columbia, H. R. MacMillian Export Company; Norwegian steamer Erviken, Pacific trade, 6 months; British motorship Cape of Good Hope, Pacific trade, 4 to 6 months, $1.30, H. R. McMillian Export Company; British steamer Madras City, 6 to 9 months, $8300, H. R. MacMillian Export Company; British steamer Paris City, Pacific trade, 4 to 6 months, $1.10, South Alberta Lumber Company; British steamer Rathlin Head, North Pacific to North of Hatteras, delivery North Pacific, $1.20. May/June.

The following tanker fixtures are reported: American tanker Gulftrade, California to Fall River, 82c, March; American tanker Agwi., same; American tanker Cape Henlopen, California to North of Hatteras, 80c, April; American tanker Agwi., same; British tanker British Star, California to Japan, 80c, April, fuel oil; American tanker Sunbeam, California to North of Hatteras, 82c, April.

The following sales are reported: American steamer Lake Superior, Pillsbury & Curtis to Pacific Spruce Lumber Company; American steamer Susquehanna, United States Shipping Board to Clyde Line; British steamer Empress of Japan (at Vancouver) $40,000, V. Lamken (to be dismantled); American steamer East Chicago (to be renamed Point Sur), United States Shipping Board to Swayne & Hoyt; American schooner Columbia, City Mill Company to Capt. R. M. Sterling, Seattle; American steamers President Grant, President Madison, President Jackson, President McKinley, and President Jefferson, $4,500,000, United States Shipping Board to Dollar Steamship Company.

PAGE BROTHERS, Brokers.

Fifty Years with the Lighthouse Service

Captain Henry Smith

One of the oldest ex-employees of the United States Lighthouse Service is Captain Henry Smith of Eureka. This still hale and hearty old sea-dog has passed his eighty-third year. His sea life is completed, insofar as active work is concerned, and he now takes life easy on a pension. But Capt. Smith just can't keep away from the sea and boats, and he has a comfortable cabin fixed up on Cousins' wharf, Eureka, where the atmosphere is salty, the talk marine, and the surroundings nautical. Captain Smith came to San Francisco in 1862, and soon after joined the Lighthouse Service. He has raised three daughters and two sons. One of the latter is in the Lighthouse Service and the other is a chief engineer on ocean steamers.

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It was announced by Gibbs Brothers, Incorporated, designers of the steamship Malolo that the conaract for incandescent signalling searchlights for that ship has been given to the Crouse-Hinds Company of Syracuse, New York.

These searchlights will operate on 115 volts, D. C., and are to be similar to those used by the United States Navy, mounted upon a pedestal base and wired complete, ready for use.

The contract for hawsers and rope for the steamship Malolo has been placed with Edwin H. Fitler Company of Philadelphia.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

Bids on Passenger Ship.

Theodore E. Ferris, naval architect at 30 Church Street, New York, will shortly call for bids for the construction of a new passenger ship for the Red D Line, 82 Wall Street, New York.

Bids Opened on Scout Cruiser.

Bids were opened April 1 by the Navy Department for the construction of Scout Cruiser Salt Lake City and propelling machinery for her sister ship the Scout Cruiser Pensacola, which will be built at the New York Navy Yard

The Navy Department had asked for bids on high pressure steam engines and on engines of normal steam pressure. Four shipbuilding companies submitted tenders for the construction of the hull of the Salt Lake City and the boilers and certain auxiliaries for both ships, while four engine building concerns submitted completed proposals on the propelling plants. The scout cruisers are to be of 10,000 tons displacement.

The Newport News Shipbuilding and Drydock Co. bid one ship and engines for both ships, $11,250,000 (high pressure); $11,150,000 (low pressure); and $11,200,000 (medium pressure).

The New York Shipbuilding Corporation, now the American Brown-Boveri Electric Corporation, bid for one ship, $10,410,000 (high pressure); $10,268,000 (low pressure); and $10,350,000 (medium pressure); bids for two sets of engines, $1,098,000 (high pressure); $1,023,000 (low pressure); and $1,037,000 (medium pressure).

Bethlehem Shipbuilding Corporation, Pennsylvania, bid for one ship complete and engines for both ships, $11,960,000; for one ship, complete with engines, $11,190,000.

General Electric Co., New York, bid for two sets of engines, $1,743,000 (high pressure); $1,783,000 (low pressure); and $1,783,000 (medium pressure).

Westinghouse Electric Co., New York, offered several alternate bids for two sets and one set of engines, the lowest for two sets being $1,356,908.

Diesel Installation Bids.

The Emergency Fleet Corporation, Department of Maintenance and Repair, New York, opened bids on April 7 for the installation of the two McIntosh & Seymour diesel engines on the Shipping Board freighters West Cusseta and West Honeker. Bids were as follows:

Bethlehem Shipbuilding Corp. Sparrows Point Plant,, $815,000; Newport News Shipbuilding & Drydock Co., $830,500; Federal Shipbuilding Co., $950,000; Morse Dry Dock & Repair Co., $1,015,000; Tietjen & Lang plant of Todd Shipyards Corp., $468,767 for one ship only.

The McIntosh & Seymour engines now nearing completion are 6-cylinder, 4-cycle, single-acting type of 2700 brake horsepower.

Bids Submitted for Tuxpanoil.

The Emergency Fleet Corporation, Washington, D. C., received three tenders for the purchase of the tank steamer Tuxpanoil, which the buyer must agree to convert to diesel engine drive. The Tuxpanoil is of 10,250 tons deadweight, 430 feet long, 59 feet beam, 33 feet 2 inches depth, 25 feet 4½ inches draft, and is powered with turbine engines.

The conversion agreement must provide that the work of conversion be done in the United States within a period of 18 months from date of purchase and that all machinery and auxiliaries be manufactured in the United States, the converted vessel to meet the requirements of the American Bureau of Shipping. The Tuxpanoil is now in New York.

The bids received were: The Oil Transport Co., Baltimore, $166,562.50; Standard Oil Co., (Calif.), $163,000. Both these bids were submitted with the understanding that the purchaser would install diesel engines. C. D. Mallory & Co., New York, bid $312,562.50 to use the vessel under present steam propulsion.

Submarine Tender Holland, launched April 16 at the United States Navy Yard, Bremerton, Washington.

Navy Department Plans Drydock.

Among the items of construction work planned by the Navy Department, and for which an appropriation of $19,177,500 has been asked from Congress is a large floating drydock for Pearl Harbor, Hawaii, to cost $5,000.000.

Shipping Board Recondition Mount Vernon.

An informal decision has been reached by the Shipping Board to recondition the steamship Mount Vernon and place her in service under the United States Lines to replace the steamship America, recently burned while undergoing reconditioning. The cost will be approximately $1,500,000, and draftsmen are now at work to outline the repairs necessary.

To Recondition Eastern Crown.

Edwin C. Bennett, naval architect of 15 Broad Street, New York, has issued specifications for reconditioning the steamer Eastern Crown. Bids were to have been opened April 3 by George Hawley, care of C. H. Sprague & Son, Boston.

Luckenbach May Build Fast Freighter.

Reports are prevalent on both coasts that the Luckenbach Steamship Company will shortly announce plans for the construction of two freight vessels of from 15 to 16 knots speed, to carry 18,000

The MALOLO

The largest and finest steamship ever built in the United States will be equipped with a special service of

America's Finest China

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The MALOLO will also be equipped with

Lenox China Electrical Fixtures

to 20,000 tons deadweight and have a length of 626 feet. It is said that the motive power has not yet been decided upon.

Bradley Transportation Company, Rogers City, Michigan, is contemplating the construction of one self-unloading freighter for operation on the Great Lakes. Plans and specifications are now being drawn up. John G. Munson, vice-president of the company, reports that the vessel will be built at a Great Lakes shipyard. The vessel will be similar to but larger than one built last year by the American Ship Building Company, which was 566 feet long and of turbo-electric propulsion, 3000 shaft horsepower, General Electric motors and Foster marine boilers.

Bids were received April 29 by Theodore Ferris, naval architect of New York, for the construction of a passenger and freight vessel for the Atlantic & Caribbean Steam Navigation Company (Red D Line). This vessel will be 335 feet 6 inches over-all, 51 feet beam, 18 feet loaded draft. She will have a deadweight tonnage of 3560 and shaft horsepower of 4140, developed by geared turbines, steam to be supplied by Babcock & Wilcox oil burning boilers. The vessel will have accommodations for 136 passengers. Deck auxiliaries are to be electrically driven. The vessel is to have the finest first class equipment and to be classed by the American Bureau of Shipping and built to the qualifications of the United States Steamboat Inspection Service.

British Columbia shipyards have received specifications for five or six new vessels for the Canadian Government Merchant Marine, which are to be operated on the Eastern Canada-West Indies and Bermuda route. They will be 410 feet long, 55 feet beam, and powered with diesel engines.

The Shipping Board, Emergency Fleet Corporation, has under consideration plans for the enlargement of passenger accommodations on the American Merchant Lines' steamers American Banker, American Trader, American Merchant, American Farmer, and American Shipper.

The St. Helens Pulp and Paper Company, St. Helens, Oregon, will shortly let contracts for construction of six barges to be used in connection with the new mill's operation. They will be 130 feet long, 34 feet beam, and 8 feet deep, and will cost about $19,000.

Calistoga and Clear Lake Co., Calistoga, Calif., are planning a passenger carrying boat for Clear Lake.

Ralph E. Winslow, naval architect, 2 Hancock Street, Atlantic, Massachusetts, has prepared and issued specifications to shipyards for bids on the construction of a diesel propelled freighter 125 feet long, 26 feet beam, and 10 feet 6 inches draft. She will have a displacement tonnage of 570 and will be powered with a 250 horsepower diesel engine.

Karl Scheel, naval architect of Seattle, Washington, has completed designs for a diesel powered yacht for a Seattle client. The yacht will be 100 feet over-all, 20 beam, and 6 feet 6 inches draft.

Recent Contracts

American Bridge Company, Pittsburgh, Pa., has an order for one towboat hull for Carnegie Steel Corp., Pittsburgh, 170′ by 38′ 10″ by 6′ 1¾″.

Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, has contract for construction of three dredge hulls for Hainesport Mining and Trans. Co.; 75′ by 35′ by 8′. They also have an order for four steel carfloats for the Pennsylvania Railroad, 250′ by 34′ by 9′, to be completed in Sept., Oct., Nov., and Dec., respectively.

Dravo Contracting Co., Pittsburgh, Pa., has an order for six steel barges for the Keystone Sand & Supply Co., 135′ by 27′ by 6′; also two 120-horsepower towboats, building for stock.

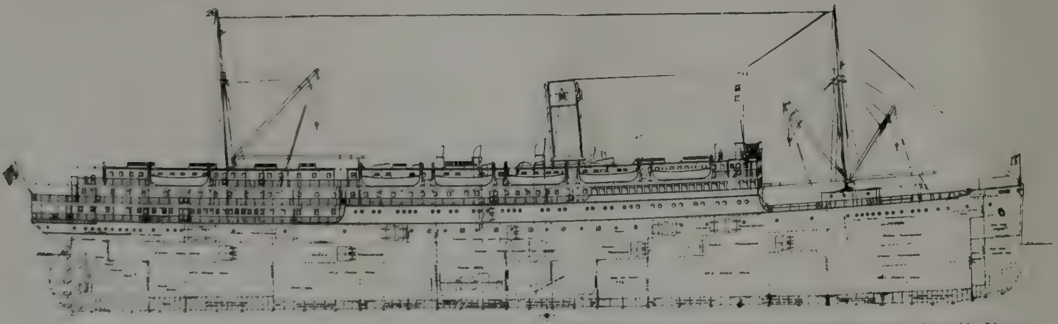
Great Lakes Engineering Works, River Rouge, Mich., is building a floating dock for Ford Motor Co. of Detroit, 250 feet long by 63 feet wide.

Howard Shipyards & Dock Co., Jeffersonville, Ind., has contract for two barges for Bahmann Iron Works, Cincinnati, O., for South American rivers. These two barges are to be bolted up at the shipbuilding plant and then dismantled and shipped to South America, crated and marked to be erected and riveted there. They are to be 85′ long, 17′ beam, 4′ deep, and 18″ light draft.

J. C. Johnson Shipyard, Port Blakely, Wn., is building four scows for stock.

Moore Dry Dock Company, Oakland, Calif., was awarded contract for reconditioning the Army Transport Somme at a cost of $38,000, several items having been removed from the original specifications. The original bid by the Moore yard was $54,828.

Collingwood Shipbuilding Co., Collingwood, Ontario, has an order for an auto and passenger ferryboat, 100 feet over-all, to be pro-



Inboard profile of passenger and freight steamer to be built by the Federal Shipbuilding and Drydock Company for the Southern Pacific Steamship Lines.

New Vessel Just Equipped with Washington-Estep Diesel Engines

Powered with the Engine That Sets New Standards of Efficiency and Economy

THAT all these boats should have been equipped with Washington-Estep Diesel Engines is the most forceful expression of confidence in their dependability that their owners could give.

Such installations as these show the adaptability of these engines to various types of service and have proven their ability to perform under the most severe conditions.

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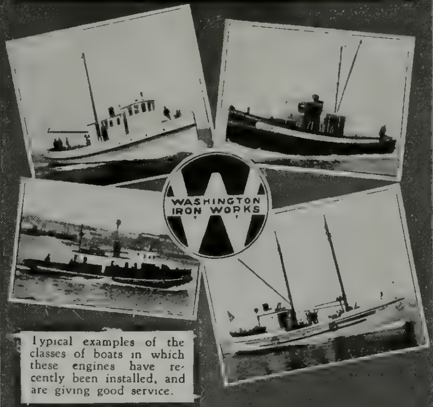
Seattle, U. S. A.



Typical examples of the classes of boats in which these engines have recently been installed, and are giving good service.

"WASHINGTON ESTEP" DIESEL ENGINES

The S.S. "SIERRA" of the Oceanic Fleet is Federal equipped

Direct Communication
from San Francisco to Sydney—
DAILY!
with a
FEDERAL C-W RADIO SET

On a recent trip the operator on board the SS. "SIERRA" of the Oceanic fleet communicated *direct* with the owners—*consistently*—during the entire voyage from San Francisco to Sydney and return.

Often the log of this and other vessels equipped with Federal C-W Radio sets show direct communication *daily* during the entire trip—and from distances as great as eight thousand miles!

Federal marine sets stand alone in performance. They are compact, occupy a minimum of space and the cost of maintenance is low. The service that follows their installation is worth investigating!

When will your vessels be FEDERAL equipped?

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RADIO
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RADIO EQUIPMENT

In Pacific Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairs

pelled by two Gardner heavy duty oil engines, developing 96 brake horsepower.

Charleston Dry Dock & Machinery Co., Charleston, S. C., has an order for a 12-inch dredge for Sanford Brook, to be fitted with steam eng. and 1 Scotch boiler.

Midland Barge Company, Midland, Pa., has order for one 82-ft. tunnel boat for General Development Co.; one sand dredge for West Virginia Sand & Gravel Co.; two decked barges, 160 by 34 by 7 ft. for Dillman Egg Case Co., Caruthersville, Mo.

Newport News Shipbuilding & Drydock Co., has order for Coast Guard Cutter for U. S. Government to be 216′ long, 39′ beam, 24′9″ draft, to be diesel-electric propelled; engs. to be supplied by McIntosh & Seymour Corp.

Bethlehem Shipbuilding Corp., Wilmington, Del., has order for two carfloats for the Long Island Railroad Co., 290 feet long, 42 beam, and 11 feet 6 inches depth, of 1200 gross tons each. This yard also has an order for three barges for the U. S. Engineers, Savannah, Ga., two of which will be 75 feet long and one 60 feet long. Total cost of barges will be $35,700.

Nashville Bridge Co., Nashville, Tenn., has an order for a dredge hull, 124 feet long, 30 feet beam, 8 feet draft, keel of which is to be laid July 1.

Staten Island Shipbuilding Co., Staten Island, New York, has an order for a tugboat for the Long Island Railroad Co., 108 feet overall, 26 ft. beam, and 13 ft. 3 inches molded depth, to be diesel-electric drive.

The **Wilmington Transportation Company**, Wilmington, California, has ordered a third diesel-electric drive towboat to be constructed by William Muller of Wilmington. This tugboat will be slightly smaller than the two now nearing completion at the William Muller yard, which are each powered with two 300-horsepower, 6-cylinder Winton diesel engines, direct-connected to a 175 kilowatt Westinghouse generator and a 30-kilowatt Westinghouse exciter.

J. C. Johnson, Shipyards, Port Blakely, Washington, has an order for a freight vessel for the Coastwise Transportation Company, designed by Karl Scheel, Seattle naval architect. The vessel is to be 90 feet long, 22 feet beam, and for Alaska coastwise trading. Cost is to be about $80,000.

American Brown-Boveri Electric Corp., Camden, N. J., is reported to have received contract for six diesel-electric ferryboats for a company now being organized for the purpose of operating between Jersey City and New York.

Spedden Shipbuilding Company, Baltimore, Maryland, has an order for a ferryboat for the Pennosol-Toumede Co. of Miami, Florida, 115 feet over-all, 44 feet beam, 12 feet 7 inches molded depth, to be propelled by a 360-horsepower Fairbank-Morse diesel engine. They also have an order for a steel tugboat for the Diamond "P" Line of Philadelphia, to be 87 feet long, 21 feet beam, 11 feet 6 inches depth, equipped with 400-horsepower Ingersoll-Rand diesel engines.

Keel Laying

Wood yacht for W. C. Rands, Detroit, by Defoe Boat & Motor Works, Bay City, Mich., Mar. 10.

Two lighters for Wm. Spencer & Son, by Federal Shipbuilding & Drydock Co., Kearny, N. J. Mar. 15 and 30.

Concrete mixer hull for Vicksburg, Miss., Engineers, by Howard Shipyards & Drydock Co., Jeffersonville, Ind., Mar. 19; also diesel

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In Atlantic Coast *Shipyards*

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ferry for Tri-State Ferry Co., Cairo, Ill., Mar. 10.

Two passenger and freight steamers for Clyde Steamship Co., N. Y. by Newport News Shipbuilding & Drydock Co., Mar. 20; also 18-knot passenger and freight steamer for Panama-Pacific Line, N. Y., Mar. 20.

Steel towboat hull for G. F. Pettinos, Philadelphia, by Spedden Shipbuilding Co., Baltimore, Md., Mar. 15; also steel hull ferryboat for Pennsylvania Terminal Co., Miami Beach, Fla., Mar. 15.

Two steel barges for Kelly Axe & Wood Co., by Chas. Ward Engineering Works, Charleston, W. Va., Mar. 20 and 30.

Twin screw steel diesel motor yacht for S. P. Davis, by Todd Engineering, Drydock & Repair Corp., Brooklyn, Mar. 25.

Tugboat hull for New York Central R. R. by Staten Island Shipbuilding Co., Mar. 29.

Barge for Sun Oil Co. by Sun Shipbuilding Co., Chester, Pa., Mar. 4.

Towboat hull by Nashville Bridge Co., April 1.

Deliveries

Richfield No. 2, oil barge for Richfield Oil Co. by Bethlehem Shipbuilding Corp., San Pedro, Calif., Mar. 27.

Trojan, cannery tender for P. E. Harris & Co., Seattle by J. C. Johnson's Shipyard, Port Blakely, Wn., Feb. 1; Uranus, fish carrier boat for P. E. Harris & Co., Feb. 6; three scows for Northwestern Fisheries Co. Mar. 10, 16, and 19.

Three steel dump scows for American Dredge Co. by Wm. Cramp & Sons, Mar. 30.

Belfont, diesel stern-wheel boat and one barge for Indiana-Belfont Trans. Co. April 1.

Two carfloats for the Pennsylvania R. R. by Sun Shipbuilding Company.

Mantua, dredge hull to U. S. Engineers by Bethlehem Shipbuilding Corp., Wilmington, Del.

Shipyard Notes

Morse Enlarges Plant.

The Morse Dry Dock & Repair Co., Brooklyn, N. Y., has announced the purchase of additional drydock facilities. This addition consists of the plant of the Alderton Dock Yards, Ltd., located on Gowanus Bay, foot of 17th Street, Brooklyn, and is to be known as the "Upper Yard" of the Morse Company.

This plant, with four blocks of waterfront on Gowanus Bay, is equipped with modern piers together with one 8000-ton dry-dock and one 10,000-ton dry-dock. The plant is also equipped with a modern machine shop, and a modern boiler and plate shop, with complete machinery and tools to take care of both large and small work. In addition there are complete blacksmith, pipe-fitting, woodworking, and other shops.

The Upper Yard will be operated with the support of the complete Morse organization, so that the service rendered will be the same as that rendered at the main plant.

Submarine Tender Launched.

The launching of the submarine tender Holland, keel for which was laid in April 1921, was held on April 16, 1925, at the Puget Sound Navy Yard, Bremerton, Washington. Her outfitting will be completed and she will be ready for commissioning about the first of June.

The Holland is 506 feet over-all, 460 feet between perpendiculars, 61 feet beam, and 20 feet loaded draft. She has a displacement tonnage of 10,000. She is equipped with Parsons turbines and express type watertube boilers capable of developing 7000 indicated horsepower, giving a loaded speed of 16 knots. The vessel has a torpedo-proof hull.

Besides being a submarine tender or "mother ship," the Holland is a submarine salvage ship, the first of its kind to be built. The lifting apparatus of this vessel is capable of hoisting more than a million pounds. A ship of this type, naval officers claim, could have raised the S-1 which sank off the Atlantic Coast last year. She will act as a supply base for twelve underseas craft and has accommodations for fifty-six of their officers and 500 of their men. Her armament consists of eight 5-inch and four 3-inch guns. The ship's complement will consist of thirty-two officers and 343 men.

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The Holland is named in honor of John Philip Holland, inventor and builder of the first successful submarine. Miss Betty Chase, daughter of Rear Admiral J. V. Chase, commandant of the Navy Yard, was the sponsor.

Federal Shipbuilding Company to Build Southern Pacific Steamer.

THE contract for the construction of the new passenger and freight ship for the Southern Pacific Steamship Lines, Pier 49, North River New York, has been given to the Federal Shipbuilding & Dry Dock Company, Kearny, New Jersey. The vessel will be 445 feet over-all, 60 feet beam, and 12,000 tons displacement at a mean draft of 25 feet 6 inches.

She will be constructed on the Isherwood longitudinal system of framing. She will be entirely of steel, with three decks.

The vessel will embody the most modern developments of marine architecture, comfort, and luxury and will also have an average deadweight cargo capacity of approximately 5700 tons, with a cubic cargo capacity of about 420,000 cubic feet, and will be built and equipped to insure the most economical and efficient handling of freight.

All latest devices have been adopted for the control of fire. Throughout the passenger accommodations, staterooms, and crew's quarters, an automatic alarm system will be installed in addition to a manual alarm system. All cargo spaces below the weather deck will be protected by the Rich smoke detecting system. With this system a Lux system of carbon-dioxide is connected and extended throughout all cargo and other closed compartments and under the floor plates in the fire room.

Accommodations will be provided for 279 first cabin passengers and 100 third cabin passengers. The interior of the passenger quarters will be of American colonial design.

Federal Shipbuilding & Drydock Corp. has contract for reconditioning of the steamship Eastern Crown, which was recently sold by the Shipping Board to C. H. Sprague & Co. of Boston for a sum of $41,800. Repairs will cost about $165,000.

Shipping Board Claims Hearing Set for May.

According to reports from Washington all the foreign testimony in connection with claims against the United States Shipping Board-Emergency Fleet Corporation filed by companies whose shipbuilding contracts were requisitioned during the war will come before the Court of Claims at Washington in May. The claimants include the Brooks-Scanlon Corporation, Standard Oil Company, and Luckenbach Steamship Company. It is not unlikely that, should the claims be paid, the Luckenbach Steamship Company will put the full amount recovered into new ships with diesel propulsion for intercoastal trade. The four Luckenbach ships requisitioned had a total dead weight of close to 50,000 tons. The decision of Supreme Court Justice McReynolds in the Brooks-Scanlon case declared that owners of new ships requisitioned by the Shipping Board-Emergency Fleet Corporation were entitled to the market price of tonnage prevailing at the time of requisitioning. It has been estimated that the Luckenbachs stand to recover between $15,000,000 and $20,000,000 for their new tonnage commendeered in 1917.

According to the latest reports from the office of Gibbs Bros., naval architects of New York, who during March called for bids for the construction of a passenger and freight vessel for the Inter-Island Steam Navigation Company of Honolulu, this vessel will not be built at this time. The reason given is that the construction of such a vessel, as designed by Gibbs Bros., would cost about $2,500,000, while the sum of money appropriated by the navigation company is $1,750,000.

The Golden Gate Ferry Company, with offices in the Hobart Building, San Francisco, recently filed revised articles of incorporation increasing the capital stock from $1,000,000 to $2,000,000 in anticipation of the purchase of additional equipment. The company has applications before the California Railroad Commission requesting permission to operate automobile ferry service between San Francisco and Berkeley and San Francisco and Alameda. One new ferryboat is now being constructed by the General Engineering & Drydock Company, Alameda, and is scheduled for early launching.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Richlube, hull 5328, diesel-electric self-propelied barge for Richfield Oil Co., 180′ 6″ L.B.P.; 32′ molded beam; 12′ molded draft. Atlas-Imperial diesel engs.; Westinghouse motors, capacity 7000 bbls. oil; keel Jan. jan. 9/26; launched Mar. 15/26; deliver May 12/26 est.

San Pedro Works

Richfield No. 2, hull 5329, oil barge, Richfield Oil Co.; 131 L.B.P.; 40 molded beam; 11′ 6″ molded draft; capacity 7000 bbls. oil; keel Jan. 18/26; **delivered Mar. 27/26.**

GENERAL ENGINEERING AND DRY-DOCK CO.,

Alameda, Calif.

Golden State, hull 1, double-ended diesel-electric ferryboat for Golden Gate Ferry Co.; 240′ over-all; 44′ molded bam; 17′ molded dpth; Pacific Werkspoor diesel engs.; G.-E. generators; keel Dec. 14/25; launch Apr. 15/26 est ; deliver May 30/26 est.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.,

San Pedro, Calif.

No name, hull 50, cabin cruiser for Don Lee; 140′ O.A.; 23′ 6″ beam; 9′ depth; 12.5 knots speed; 242 DWT.; diesel engs.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

Trojan, hull 47, cannery tender for P. E. Harris & Co., Seattle; 85 long x 18 6 draft x 10 depth; keel Nov. 9/25; launched Jan. 5/26, **delivered Feb. 1/26.**

Uranus, hull 49, fish carrier boat for P. E. Harris & Co ; 36 ft. long; keel Nov. 16/25; **launched Feb. 4/26; delivered Feb. 6/26.**

Hull 60, one scow for Northwestern Fisheries Co., Seattle; 54ft. long; **delivered Mar. 16/26.**

Hull 61, one scow same as above; **delivered Mar. 19/26.**

Hull 62, one scow for Northwestern Fisheries Co., Seattle: 32 x 90 ft ; **delivered Mar. 10/26.**

Hull 69, scow for stock, 110 x 36 x 8′ 8″; **keel Mar. 24/26.**

Hull 70, scow for stock, 110 x 36 x 8′ 8″; **keel Mar. 29/26.**

Hull 71, scow for stock, 110 x 36 x 8′ 8″; keel Apr. 15/26 est

LAKE WASHINGTON SHIPYARDS

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Yacht for Frank Manz, 56′ long, 14′ beam; 6′ draft; 100 I.H P. Hall-Scott eng.

Yacht for Wm. Trimshaw, 50′ long; 100 H.P. Eastern Std eng

MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

No name, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; keel May 1/26 est.; launch Oct. 1/26 est.; deliver Dec. 1/26 est.

No name, hull 171, sister to above; keel May 1/26 est.; launch Oct. 15/26 est.; deliver Dec. 15/26 est.

Hull 169, steel carfloat for Atchison, Topeka & Santa Fe R.R.; 260′ long; 38′ beam; 7′ draft; 620 D.W.T.; **keel Apr. 1/26;** launch Aug. 15/26, est.; deliver Aug. 31/26 est.

NAVY YARD

Puget Sound

Holland, sumbarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed; turbine eng. 7000 IHP; two WT express type boilers; 10,000 tons disp.; keel Apr. 11/21; **launched Apr. 16/26;** deliver June 1/26 est.

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

ST. HELENS SHIP COMPANY,

St. Helens, Oregon.

Larch, tender for Lighthouse Dept.; 63′ long, 16′ width, 6′ hold; 100 H.P. Washington-Estep diesel engs.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

One fueling scow for Ohio River Co., 90x26x8 feet.

Twenty-five barges for Carnegie Steel Co.; 175′x 26′x11′.

Six barges for The Barrett Line, Inc., Cincinnati; 225′x36′x8′.

Three towboat hulls for Carnegie Steel Co., Pittsburgh; 149′ 2″ x 33′ 4″x5′ 10-5/16″.

One towboat hull for Carnegie Steel Corp., Pittsburgh; 170′ x 38′ 10″ x 6′ 1¾″.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

Gulfcrest, hull 304, diesel tanker, Gulf Refining Co., 480 ft. long; 9500 gro. tons; 13,000 DWT; New York-Werkspoor engs. 3200 BHP; keel May 25; launched Feb. 27/26; deliver April/26 est.

Hull 312, dredge hull, 140 ft long, for Bneyons Co.; keel Sept./25; deliver April /26 est.

Hull No. 313, dredge hull for American Dredging Co., 135 long; keel Sept./25; deliver April/26 est.

Hull 314, suction dredge for U.S. Engineers; 130′ R.R.; 366′ long; 2 tracks; platform; keels Apr./26 est

Hulls 315-318 inc.; 4 carfloats for N.Y. Central R.R.; 366′ long; 2 tracks; platform; keels April/26 est.

THE AMERICAN SHIPBUILDING COMPANY

Cleveland, Ohio

W. H. Gerhauser, vice-president and director of purchases.

Col. James Pickands, hull, 791, bulk freighter, Pickands, Mather & Co., 580 L.B.P.; 60 beam; 20 loaded draft; 13 mi. speed; 12,000 D.W.T.; 2200 IHP.; trip. exp. engs.; 3 B. & W. boilers; launched

Jan. 16/26; deliver Apr. 15/26 est.
Samuel Mather, hull 792, sister to above; launched Feb. 13/26; deliver April 15/26 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT
Quincy, Mass.

Lexington, hull 1300, airplane-carrier U.S.N., launched Oct. 3/25.

No name, hull 1398, ferryboat for City of Boston, 172 L.B.P.; 40-8 beam; 10-4½ draft; 2 Comp. engs. 860 I.H.P.; 2 Scotch boilers; 10′ dia. 13′ long.
No name, hull 1399, sister to above.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT
Wilmington, Del.

Port Houston, hull 3500, fireboat for the City of Houston, Texas; 117-6 LBP; 27 beam; 8-6 loaded draft; twin screw; diesel-electric drive; 14 mi speed; two 500 HP Winton 4-cycle diesel engs; Westinghouse generators; keel Oct. 5/25; launched Feb. 16/26.

Philadelphia, hull 3501, ferryboat, for Philadelphia & Reading R.R.Co.; 198 L.B.P.; 35 beam; 10 draft; comp. engs. 1100 I.H.P.; 2 Scotch boilers, 11x21 ft.; keel Dec. 2/25; **launched Mar. 18/26.**

Cape May, hull 3502, sister to above; keel Dec. 15/25.

Mantua, hull 3503, dredge hull for U.S. Engineers, Wilmington, Del.; 86′ L.B.P.; 24′ beam, 7′ depth; launched Jan. 25/26; **delivered Mar. 13/26.**

No name, hull 3504, passenger and auto ferryboat for Fisher's Island Navigation Co.; 150′ L.B.P.; 40′ beam; 15′ 6″ depth; Scotch boilers; single screw; 800 H.P.
No. 20, hull 3505, carfloat for Long Island R.R. Co.; 290 L.B.P.; 42 beams; 11′ 6″ loaded draft; 1200 gross tons.
No. 21, hull 3506, carfloat save as above.
Hull 3507, barge for U.S. Engineers, Savannah, Ga., 60 L.B.P., 22 beam; 4 loaded draft; 44 gross tons.
Hull 3508, barge same as above
Hull 3509, barge same as above.

CHARLESTON DRY DOCK & MACHINERY COMPANY
Charleston, S. C.

Purchasing Agent: Charles R. Valk.
Daytona Beach No. 2, freighter for Daytona Beach, Fla.; 22 beam, 4 draft; 8 knots, 60 I.H.P. Fairbanks-Morse diesel engs.
Two lighters for Daytona Beach, Fla.
Hydraulic dredge for Sanford & Brooks.
No name; hull 11, diesel double-ended drive ferryboat for Cooper River Ferry Commission, Charleston, S.C.; 120 L.B.P.; 35 beam; 6′ 6″ draft, 8 knots speed; 360 I.H.P. diesel engs.; keel Jan. 20/26 est.
Charleston, 12-inch suction dredge for Sanford Brook, steam eng.; 1 Scotch boiler.

COLLINGWOOD SHIPBUILDING CO.
Collingwood, Ontario

Purchasing Agent: E. Podmore.
No. name, hull 77, auto and passenger ferryboat for International Transit Company, Sault Ste. Marie, Ont.: 100′ L.O.A.; 34′ beam; 6′ 6″ loaded draft; 8 knots speed; 2 Gardiner semi-diesel engines; 96 B.H.P.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Saga, hull 2824, cruiser, Hugh Cresswell, 68′x12′; Sterling engs.
Vasanta, hull 2826, cruiser, G. M. Pynchon, 92′x16′; 2-300 H.P. Speedway engs.
Rainbow III., hull 2827, cruiser, .R P. Joy; 62′x12′; 2-180 H.P. Speedway engs.
Zinzance II., hull 2828, cruiser, E. S. Moore; 81′x14′ 6″; 2-500 H.P. Wright Typhoon engs.
Lura M. II., hull 2836, cruiser, W. A. Fisher; 80′x14′; 2 Winton engs.
Signal II., hull 2837, cruiser, W. M. Chesebrough, 48′x12′; 1 MR6-180 H.P. Speedway eng.
Hull 2840, cruiser, H. Darlington, 81′x14′6″; 2-500 H.P. Wright Typhoon engs.
Robaliss III., hull 2841, cruiser, R. L. Corby; 73′x12′6″; 2-300 H.P. Speedway engs.
Evening Star, hull 2842, cruiser, H. H. Demmert; 71′x13′; 2 MR-6-180 H.P. Speedway engs.
Avalanche III., hull 2843, cruiser, Anson Hard; 100′x16′; 2-300 H.P. Speedway engs.
Carminita II., hull 2844, cruiser, G. E. Halliday; 60′x13′; 1-115 H.P. Speedway eng.
Marinette II., hull 2846, cruiser, E C. Romph; 74′x15′; 2-300 H.P. Speedway eng.
Kegonsa, hull 2847, cruiser, G. Dahl; 81′x14′; 2-500 H.P. Wright Typhoon engs.
Hull 2859, cruiser, Dr. J. A. Victor; 82′x14′6″; 2-300 H.P. Speedway engs.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO.
Philadelphia, Pa.

Purchasing Agent: Ed. C. Geehr.

Malolo, hull 509, express psgr and frt liner, Matson Navigation Co.; 582 LOA; 577 length at water line; 83 ft beam; depth molded to C deck 54 ft; displacement 22,050 tons; 8250 DWT; speed 22 knots regular, 23 knots maximum; 25,000 shaft horsepower; Cramp-Parsons turbines; oil burning B & W water-tube boilers; keel May 4/25; launch May/26 est.

No name, hull 518, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55-6 beam; 29-6 molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears, six single-ended Scotch boilers; keel Feb. 23/26; launch Aug./26 est

Hulls 519-523 inc., 5 steel dump scows for American Dredging Co.; 550 cu. yds. capacity; 112 length, molded; 34 beam; 12 depth molded; keels Dec. 7, 8, 23/25; 2 delivered Feb. 24/26; **3 delivered Mar. 30/26.**

No name, hull 524, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55′6″ beam; 29′6″ molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears; 6 single-ended Scotch boilers; keel May/26 est; deliver Nov./26 est.

Hulls 525-526, 2 steel dredge hulls for Hainesport Mining and Trans. Co.; 75′ molded length; 35′ molded beam; 8′ molded depth; **launch Apr./26 est.**

Hull 527, steel carfloat for Pennsylvania R.R.; 250′ molded length; 34′ molded breadth; 9′ molded depth; launch Sept./26 est.

Hull 528, same as above; launch Oct./26 est.

Hull 529, same as above; launch Nov. 26 est.

Hull 530, same as above; launch Nov./26 est.

DEFOE BOAT & MOTOR WORKS
Bay City, Mich.

Purchasing Agent: G. O. Williams.

Hull No. 85, steel vessel U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 210 DWT; 300 IHP, diesel engs.; keel April/25; **launched April 2/26;** deliver April 15/26 est.

Hull No. 86, sister to above; keel Apr10/25; launch April 15/26, est.; deliver April 15/26, est.

Hull No. 87, sister to above; keel Apr18/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hul No. 88, sister to above; keel May5/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 89, sister to above; keel June15/25; launch April 11/26, est; deliver Apr. 15/26, est.

Hull 90, steel patrol boat for U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 12 mi speed; 210 DWT; 300 IHP diesel engs; keel Nov. 1/25; deliver April 15/26, est.

Hull 91; sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 92, sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Sylvia, hull 93, steel yacht, Logan G. Thomson; 133 LBP; 21-6 beam; 7-6 loaded draft; 14 mi speed; 600 IHP twin Bessmer diesel engs.; keel Nov. 15/25; launch May 1/26 est.; deliver May 15/26 est.

Lassie, hull 95, wooden yacht for T. B. Van Dorn, Cleveland, same as above; keel Jan. 1/26; launch May 1/26, est.; deliver May 15/26, est.

No name, hull 96, wooden yacht for Hacker & Ferman, Detroit; same as above; keel Jan. 1/26; launch May 1/26, est; deliver May 15/26, est.

Bo Peep II., hull 111, wood yacht, for I. M. Kirlin of Detroit; 55 L.B.P.; 13 beam; 3′ 9″ draft; 13 mi. speed; 13 D.W.T.; 140 H.P. gas engs.; keel Jan. 15/26; launch May 1/26 est.; deliver June 1/26 est.

No name, hull 112, wood yacht for Alex McLeod of Detroit, same as above; keel Feb. 1/26; launch May 1/26 est.; deliver June 15/26 est.

No name, hull 118, wood yacht for John J. Barlum of Detroit; 65 LBP; 12′ 6″ beam; 3′ 6″ draft; 28 mi. speed; 15 D.W.T.; 600 H.P. gas engs.; keel Jan. 18/26; launch May 15-26 est.

No name, hull 119, wooden yacht for Contgomery Whaling, Detroit; 44′ L.B.P.; 10′6″ beam; 2′11″ loaded draft; 22 mi. speed; 10 DWT.; 200 H.P. gas engs.; keel Feb. 1/26; launch May 1/26 est.; delivery June 1/26 est.

No name, hull 120, wood yacht for W. C. Rands, Detroit; 83′ L.B.P.; 15′ beam; 3′6″ loaded draft; 35 mi. speed; 60 D.W.T.; 1200 I.H.P. gas engs.; **keel Mar. 10/26**; launch June 1/26 est.; deliver June 15/26 est.

DRAVO CONTRACTING COMPANY
Pittsburgh, Pa.

Wakerobin, hull 453, lighthouse tender for Bureau of Lighthouses, 153-6 long, 43 beam; 6-6 depth; 900 gro. tons.

Hull 454, 1 sand digger for Keystone Sand & Supply Co., Pittsburgh, 153-6x43x6-6; 900 gro. tons.

Hulls 465-476 inc., 12 steel barges for stock; 100x26x6′6″; 135 gro. tons ea.

Hulls 477-486 inc., 10 steel barges for Equitable Towing & Trans. Co.; 140x26x9 ft.; 230 gro. tons ea.

Hulls 487-492 inc., 6 steel barges for stock; 130x30x7′ 6″; 830 gro. tons ea.

Hulls 493-502 inc., 10 steel barges for stock; 230x45x11 ft.; 650. gro tons ea.

Hulls 434-438 inc. and 503; 6 steel barges for Keystone Sand & Supply Co.; 135′ x 27′ x 6′; 320 gro. tons ea.

Hulls 504-505, two 120-H.P. towboats for stock; 74′ 2″ x 16′ x 4′; 25 gro. tons ea.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent: R. S. Page.

Steel Chemist, hull 83, freighter, U. S. Steel Corp.; 250 LBP; 42 ft 9 in beam; 20 loaded draft; 2100 DWT; Worthington engs. 950 SHP; keel Sept. 15/26; **launched Mar. 9/26.**

Steel Electrician, hull 84, diesel-electric freighter, U. S. Steel Corp.; 250 LBP; 42-9 beam; 20 loaded draft; 2100 DWT; 750 BHP Nelseco engs; keel Sept. 24/25.

Willets Point, hull 85, seagoing, diesel-electric hopper dredge for U. S. Army Engineers; 193 ft LBP; 41 beam; 19 ft 6 in depth molded; two Winton diesel engines; keel Dec. 16/25.

No name, hull 86, tanker for Gulf Refining Co.; 525′ L.B.P.; 74′ beam; 28′ loaded draft; 11 knots speed; 17,400 D.W.T.; 4500 I.H.P. diesel engs.
Hull 87, lighter for Wm. Spencer & Son; 104′ 6″ long, 32′ beam; 10′ depth; 300 D.W.T.; **keel Mar. 15/26.**

Hull 88, lighter, sister to above; **keel March 30/26.**

GREAT LAKES ENGINEERING WORKS
River Rouge, Mich.

Purchasing Agent: Chas. Short.
Hull 253, dump scow for Great Lakes Dredge & Dock Co., Chicago; 1500 cu. yds. capacity; keel Mar. 10/26 est; launch May 10/26 est.
Hull 254, floating dock for Ford Motor Co., Detroit; 250x63 ft.; deliver May 31/26 est.

HOWARD SHIPYARDS & DOCK COMPANY
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.
Gouverneur, hull 1583, diesel-electric towboat for U.S. Engineers, St. Louis, 100 LBP; 23 beam; 4 draft: 2 150-H.P. diesel engs.; keel Nov. 1/25; launched Feb. 16/26; deliver May 20/26 est.

Louisiana, hull 1586, steam ferry, catamaran type, for Baton Rouge Trans. Co.; 150 LBP; 50 deck beam, 18 hull beam; 5 loaded draft; high pressure steam engs.; 500 I.H.P.; 2 firetube boilers 44″x22′; keel Feb. 20/26; launch May 15/26 est.; deliver Sept. 15/26 est.

No name, hull 1587, maneuver hull for Vicksburg Engineers; 60x26x6ft.; keel April 5/26 est.
No name, hull 1588, concrete mixer hull for Vicksburg Engineers, 128x42x7 ft.; **keel March 19/26.**

No name, hull 1589, diesel ferry for Tri-State Ferry Co., Cairo, Ill.; 100x30x5 ft.; 200 I.H.P. diesel engs.; **keel March 10/26.**

No name, hull 1590, diesel-electric side-wheel excursion boat for stock; 250x40x7 ft.; 15 mi. speed; 2400 HP diesel engs.

No name, hull 1591, steam ferryboat for Vicksburg & Delta Ferry Co., Vicksburg, Miss.; 140′ L.B.P.; 32′ beam; 6′ deep; 3′ loaded draft; 10 mi. speed; abt. 250 D.W.T.; straight, high pr. engs, 12′x6′; 2 fire tube boilers; 44′|x22|; keel Apr. 8/26 est

No name, hull 1592, steam towboat for Barrett Line, Cincinnati; 125′ L.B.P.; 40′ beam; 6′ deep; 4′ loaded draft; comp. engs. 18″x32″x6′; 4 Scotch boilers, 44″x22′; keel Apr. 15/26 est.

Hull 1593, steel hull for stmr. Mississippi of Mississippi River Com., St. Louis, Mo.

Hull 1594, two K.D. barges for Bahmann Iron Works, Cincinnati, for shipment to South America for assembly; 85 L.B.P.; 17 beam; 4′ depth; 18″ light draft.

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent: H. Meyer.

No name, hull 222, double-end car ferry, Wabash Railroad; 370 L. O. A.; 65 beam, 21 ft 6 in depth; two screws at each end; 4 comp. engs. of 1000 HP each; 6 Scotch marine boilers; keel Nov. 30/25; deliver March 20/26 est.

MARIETTA MANUFACTURING CO.
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Hulls 145-150, inc., six barges for Indiana-Belfont Transportation Co.; 150 long; 36 beam; 10 draft keels Aug 15/25, **5 delivered.**

Belfont, hull 151, diesel stern-wheel, for Indiana-Belfont Transportation Co.; 100 long, 24 beam; 4-4 draft; 360 HP Fairbanks-Morse diesel engs., keel Oct 25/25, **delivered April 1/26.**

MIDLAND BARGE COMPANY
Midland, Pa.

Purchasing Agent: H. S. Neal.

Contract 1045, dredge for Alleghany River Sand Co., Pittsburgh.

Contract 1050, 6 hopper barges for Alleghany River Sand Corp.

Contract 1051, 2 steel wharf boats with steel cabins for Baton Rouge Trans. Co.; 110'x30'x6'.

Contract 1052, 12 steel deck flat scows, 75'x25'x5' 6"; for Sate of New York, dept. of public works, Bureau of Canals.

One tunnel boat for General Development Co.; 82' long.

One sand dredge for West Virginia Sand & Gravel Co.

Two decked barges for Dillman Egg Case Co., Caruthersville, Mo.; 160'x34'x7'.

MIDLAND SHIPBUILDING COMPANY, LTD.
Midland, Ontario

Purchasing Agent: R. S. McLaughlin.

Glenmohr, hull 16, single deck freighter for Great Lakes Transportation Co., Ltd., Midland, Ontario; 633 L. O. A.; 70 beam; 29 depth; 11 knots speed; 18 ft. loaded draft; 15,000 D.W.T.; TE engs. 3000 HP; keel Nov. 18/25; launch July 14/26, est.

NASHVILLE BRIDGE COMPANY
Nashville, Tenn.

Purchasing Agent: Leo E. Wege.

Nashville B., hull 92, diesel towboat, builders' account; 110 LBP; 28 beam; 5 loaded draft 400 IHP diesel engs.; keel May 1/25; launched Oct. 27/25.

Burnett, hull 94; diesel-electric towboat, U. S. Engineers; 70 LBP; 17 beam; 4 draft; 150 HP TE engs.; keel Oct. 10/25; launch Feb. 25/26, est.

Gillett, hull 95, same as above; keel Oct. 15/25; launched Apr. 1/26.

Hull 103, deck barge, 142x32x9; keel Jan. 15/26, launched and delivered March 10/26.

Hull 104, dredge hull, 75x24x5 ft.; **keel Feb. 15/26; delivered Mar. 20/26.**

Hull 105, barge 180'x36'x7'; keel Apr. 20/26 est.; launch May 25/26 est.; delivery June 1/26 est.

Hull 106, towboat hull, 68'x14'x3'2"; **keel Apr. 1/26;** deliver May 1/26 est.

Hull 107, dredge hull, 124 L.B.P.; 30 beam; 8 draft; keel July 1/26 est.; launch and deliver Aug. 1/26 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas: Plummer, 233 Broadway New York City.

Chatham, hull 288, combination passenger and freight steamer, Merchants & Miners Transportion Co., Baltimore, Md.; 350 length; 52 beam; 36 depth; 13½ mi speed; TE eng; 4 Scotch oil-fired boilers; keel July 30/25; launched Feb. 3/26. deliver May/26, est.

Dorchester, hull 289, sister to above; keel Sept 10/25; **launched March 20/26.**

Fairfax, hull 290, sister to above; keel Nov. 12/25; launch May/26 est.; deliver Aug./26 est.

Raymond, Hull 292, diesel electric, 20-in. pipe line dredge, U. S. Engineers, Philadelphia, 230 ft. long; 40 ft. beam; 14 ft. depth; McIntosh & Seymour diesel engs.; keel Nov. 19/25: **launched Mar. 20/26.**

Savarona, hull 303, diesel yacht, 2 screws for R. M. Cadwalader; 174 L.O.A.; 27 beam; 15 ft. 8 in depth· Winton engs.; keel Jan. 16/26; **launched Mar. 20/26.**

Arcadia, hull 304, diesel yacht, 2 screw, for Galen L. Stone; 177 L.O.A.; 27 ft 6 in beam; 15 ft 8 in depth; Winton engs.; keel Feb. 11/26; **launched Apr. 3/26.**

Josephine, hull 305, diesel yacht, 2 screw, for E S Burke, Jr., 132 L.O A.; 24 beam; 13 ft 1 in depth; Winton engs.; keel Feb. 1/26; **launched March 20/26.**

No name, hull 306, passenger and freight steamship for Clyde Steamship Company, New York, 407'-3" overall, 62'-0" beam, 30'-6" depth, Newport News turbines and gear; 8500 I.H.P.; Scocth boilers; oil burning; **keel March 20/26.**

No name, hull 307, sister to above; keel April/26 est; launch Jan./27 est.

Aras, hull 308, diesel engine yacht, for Hugh J. Chisholm; 162'-0" long, 26'-0" beam, 14'-6" depth; Winton diesel engs.; keel Feb. 1/26; **launched March 20/26.**

Hulls 309-311, inc., three house barges, for Chesapeake & Ohio Railway; 100'-0" long, 30'-0" beam, 8'x6" depth; keels Jan. 16/26; **launched March 20/26.**

Hull 312, one carfloat, for Chesapeake & Ohio Railway, 256-0" long, 36'-0" beam, 10'-0" depth; keels Jan. 30/26; **launched March 10/26.**

No name, hull 313, tugboat hull, for the Pennsylvania Railroad, 80'-0" long, 19'-0" beam, 12'-6" depth; **keel March 15/26;** launch and deliver May/26 est.

No name, hull 314, sister to above; **keel Mar. 23/26;** launch and deliver May/26 est.

No name, hull 315, 18-knot, passenger liner for Panama Pacific Line, New York; 600 ft. long, 80 ft. beam, 52 ft. depth; watertube boilers for oil 22,000 gross tons; 17,000 I.H.P.; **keel Mar. 20/26.** launch Feb./27 est.

Robador, hull 316, diesel engine yacht, for Robert Law, Jr., 160'-6" long, 26'-0" beam, 14'-9" depth; keel April/26 est; launch June/26 est; deliver July/26 est.

No name, hull 317, passenger and freight steamship for Clyde Steamship Co., New York, 402'-0" overall, 55"-0" beam, 31'-6" depth; Newport News turbines and gears; Scotch boilers for oil burning; **keel March 23/26;** launch Sept./26 est.; deliver Dec./26 est.

No name, hull 318, coast guard cutter for U. S. Government; 216' long; 39' beam; 24'9" draft; diesel-electric propulsion; McIntosh & Seymour engs.

THE PUSEY & JONES CO.
Wilmington, Del.

Purchasing Agent: James Bradford.

John Cadwalader, hull 1030, single screw pass.-freight steamer for Baltimore & Philadelphia Steamboat Co., Philadelphia; 219 L.B.P.; 45 beam; 11 loaded draft; 14½ mi speed; 4 crank, TE engs. 21-32-35-35 by 24"; two B. & W. water-tube boilers, 3046 sq. ft. heating surface each; keel Nov. 11/25; **launched March 27/26;** deliver July 1/26, est.

No name, hull 1031, sister to above.

Siele, hull 1032, twin screw diesel yacht for John H. French, Detroit; 124 L.O.A.; 20-6 beam; 6-10 draft; 2 300 HP Winton diesel engs.; keel Dec. 1/25; launch April 10/26 est.; deliver June 1/26, est.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Md.

Purchasing Agent: W. J. Collison.

No name, hull 262, steel hull towboat, G. F. Pettinos, Philadelphia; 87' LOA x 21' beamx11'6" draft; 400 H.P. Ingersoll-Rand diesel engs.; **keel March 15/26.**

No name, hull 263, steel hull ferryboat, Peninsula Terminal Co., Miami Beach, Fla.; 115' LOA; 44' over guards; 12' draft; 360 H.P. Fairbanks-Morse diesel engs.; keel **March 15/26.**

STATEN ISLAND SHIPBUILDING COMPANY
Staten Island, N. Y.

Purchasing agent: R. C. Miller.

American Legion, hull 764, ferryboat for City of New York, 264 L.O.A.; 66 beam over-all, 47 beam mld.; 14 loaded draft; 15 mi. speed; abt. 2600 gro. tons; 2 comp. engines, 3500 I.H.P.; 4 W.T. boilers; keel Feb. 8/26.

No. 33, hull 765 tugboat hull for New York Cenral R.R.; 96'x26'x10'-3"; 12 knots speed; 200 gr. tons; 650 I.H.P. diesel-electric prop. unit; **keel Mar. 29/26;** deliver July/26, est.

No. 34, hull 766, tugboat, sister to above.

Hull 767, barge for National Lead Co.

Meitowax, hull 768, tugboat for Long Island Railroad Co.; 108' L.O.A.; 26' beam; 13'2" molded depth; diesel-electric propulsion; deliver Oct./26 est.

SUN SHIPBUILDING COMPANY
Chester, Penn.

Purchasing Agent: H. W. Scott.

Hull 85, carfloat. Pennsylvania Railroad; 358 LBP; 47 ft 4 in beam; 12 ft 6 in depth; keel July 29/25; **launched Mar.10/26; delivered Mar. 17/26.**

Hull 86 sister to above; keel Aug. 1/25; **launched Mar. 24/26; delivered Apr. 1/26.**

Hull 95, barge for Sun Oil Co., 100x19x9, 50,000 gals. cap.; 100 B.H.P. engs.; **keel Mar. 4/26.**

Hull 96, barge for Sun Oil Co. 158-x24-4-x11-3, 150,000 gals. cap; 150 B.H.P.

Hull 97, barge for Sun Oil Co., 260x40x15; 750 BHP. engs.

TODD ENGINEERING, DRYDOCK & REPAIR CORP.
Brooklyn, N. Y.

Sumar, hull 37, steel twin-screw diesel motor yacht for David C. Whitney; 151' LBP; 26' beam; 12' loaded draft; 2 Bessemer diesel engs. 420 S.H.P. each; keel Jan. 19/26; launch April 14/26 est.; deliver May/26 est.

No name, hull 39, steel twin-screw diesel motor yacht for S. P. Davis; 162' 10" L.B.P.; 27' 4" beam, 13' loaded draft; 14 mi. speed; 2 Bessemer diesel engs; 800 S H P. ea.; **keel March 25/26.**

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

E. D. Kenna, hull 38, sternwheel towboat, The Ohio River Co.; 145 LBP; 32 beam; 5 draft; recip. 700 IHP engs.; return tubular boilers, 42 in. x 26 ft.; keel Jan. 15/26.

No name, hull 42, steel barge, Kelly Axe & Tool Co.; 150 long, 26 beam; 8 deep; keel Jan. 11/26; launched March 1/26.

No name, hull 43, sister to above; keel Jan. 15/26; launched March 1/26.

No name, hull 44, sister to above; **keel Mar 2/26.**

No name, hull 45, sister to above; **keel Mar. 30/26.**

No name, hull 46, sister to above.

No name, hull 47, sister to above.

Repairs

BETHLEHEM SHIPBUILDING CORP.,
San Francisco.
Potrero Works

Drydock, paint, misc. repairs: J. C. Fitzsimmons, Ventura, Lubrico, Niels Nielsen, Cazadero, Virginian, President Van Buren, Iowan, President Pierce, Erskine M. Phelps, Glendale, Montanan, Texan, R. J. Hanna, Maweena, Charlie Watson, President Hayes, President Taft, Point Judith, Meigs, D. G. Scofield, Java Arrow, American. Drydock, paint, engine, boiler, hull repairs: Montezano, Mericos H. Whittier, Tahiti, W. B. Storey, Rose City, Boren, Mahukona. Engine, boiler, hull repairs: Guerrero, Sabotawan, Chiapas, Limnea, Katherine G. Sudden, Waihemo, Edna Christensen, Agwipond, Waihuna. Propeller repairs: Tisharen, Marin, Frank H. Buck, President Wilson, Carlos. Tailshaft repairs: West Sequana, Java Arrow, Admiral Fiske. Engine: Shreveport, President Munroe. Install engine: Idalia. Make new rudder: Mahukona. Misc.: British Monarch, City of Richmond, Willamette, Charles Van Damme, Caspar, Tamalpais, Willapa, Mongolia, Sonoma, Australia, Lio, Madrona, Invincible, Missourian, Tascalusa, Frank G. Drum, Iwatesan Maru, Enterprise, Finland, La Purisma, Chihuahua, Catherine Donovan, Manoa, Edgar F. Luckenbach, Matsonia, W. S. Miller, Sagadahoc, Panaman, K. R. Kingsbury, Katrina Luckenbach, J. L. Luckenbach, McKittrick, Dakotan, W. S. Rheem, Suportco, Kansan, George Allen, Greylock.

San Pedro Works

Drydock and repair: Stmrs. Missoula, Admiral Fiske, Olinda, Radiant, El Capitan, Coalinga, tug Restless. Misc. repairs: Stmrs. Yorba Linda, Liebre, Geo. W. Barnes, Halo, Onward, Newport, Nordanger, Guerrero, West Katan, San Ubaldo, San Gaspar, British Star, Ario, Montauk, British Monarch, Standard Arrow, Mojave, m.s. Los Alamos, launch Excelsior, barges Newport, Richfield No. 2.

CHARLESTON DRY DOCK AND MACHINERY CO.
Charleston, S.C.

Total overhaul: Tug Tanken. Boiler repair: Mesopotamia. Rudder repairs: Virginia Dean. Fire damage: yt. Spitfire. Repaired: Austanard.

LOS ANGELES SHIPBUILDING & DRYDOCK CORP.
San Pedro, Calif.

Clean, paint, misc. repairs: m.s. Angel, stmrs. Olympic, Washtenaw, El Capitan (bilge keel restored, 2 plates renewed). Painted, new propeller fitted: schr. yt. Dwyn Wen. Propeller dismounted, shaft drawn and renewed, fire damage repairs: stmr. West Sequana. Cleaned and painted: barge Bacchus, L.A. City No. 2.

NAVY YARD, BREMERTON, WASH.

Dock and misc. repairs: Tennessee, Thompson. Misc. repairs: Pennsylvania, Idaho, Sinclair, Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

TODD DRY DOCKS, INC.
Seattle, Wash.

Dock, clean, paint, annual overhaul: Bobolink, Cacique, Geisha, President Jackson. General overhaul: U.S.S. Algonquin, Queen, West Notus. Hull repairs: Derblay (account stranding). General alterations: Patterson Install deep tank, misc. repairs: West Ison. Misc. repairs: Arrow, Admiral Schley, Admiral Sebree, Admiral Watson, Kulshan, Sol Duc, Tourist, Tacoma, Western Knight.

VICTORIA MACHINERY DEPOT CO.,
Victoria, B. C.

Boiler repairs: stmrs. Grey, Blue, White, Grant, Green, Princess Ena, tug Swell, Topaz. Deck, hull, engine repairs: stmr. Armentieres. Dock, clean, paint, remodel interior, hull, engine: stmr. Orion. Dock, clean, paint, new tailshafts and stern bearings, hull, deck: Estevan. Deck: tug Spray. Engine and hull: Grainer.

PRINCE RUPERT DRY DOCK AND SHIPYARD.
Prince Rupert, B.C.

Marfish. Dock, clean, paint, convert to fuel oil carrier, annual overhaul: stmrs. Canadian Coaster, Canadian Observer. Dock, clean, paint, misc. repairs: 9 halibut fishing boats, Prince Rupert, U.S.S. Boxer. Misc. repairs: 7 halibut fishing boats and 95 other commercial jobs.

Personal Paragraphs and Items of Interest

S. F. Embarcadero Bus Line—In interest of this important project for the famous waterfront of San Francisco an enthusiastic meeting of members of the Pacific American Steamship Association, the Shipowners' Association of the Pacific Coast, the Waterfront Employers' Union, the Foreign Trade Club, and representatives of waterfront industries was held last month aboard the Dollar liner President Wilson. The leaders of the Pacific Coast's shipping world attended in support of the signing of the contract between the Board of State Harbor Commissioners and the City of San Francisco, and many voiced the necessity for immediate provision of bus-line transportation. Norman F. Titus, assistant general manager of the McCormick Line, was chairman. Milton J. Cook of the Chamber of Commerce, and Charles L. Wheeler, vice-president and general manager of the McCormick Line, were among the well-known speakers. Bids have been asked from manufacturers of bus coaches, and "P M. R." joins the circle in hoping that the plan soon becomes operative.

Coen Company, Inc.—This well-known firm of oil burning specialists announce the appointment of the A. K. Miller Engineering Co., 109 Tchoupitoulas Street, New Orleans, as agents for that territory, carrying on consignment a complete stock of repair parts and equipment. The Coen Company also announces that after May 15, 1926, the A. K. Miller Engineering Company will become representatives at Mobile, Alabama, filling requirements for parts and service at that port. Head offices of the Coen Company are at 112 Market Street, San Francisco. Offices are maintained at Seattle, Portland, Oregon, and New York. The opening of the branches in New Orleans and Mobile is indicative of the progressive policy of the firm in expanding to meet the requirements of the oil burner trade.

Dan Ford—This Widely known veteran shipping expert has opened an office at 15 Whitehall Street in New York, where he is conducting a business as naval architect and consulting engineer.

W. S. Ray Mfg. Co.—Milton Ray announces the installation of Ray oil burning galley ranges on the five outstanding diesel yachts of 1926; namely, the Pawnee of Harry Payne Bingham; the Arcadia, Galen L. Stone; the Savarona, Richard M. Cadwalader; the Josephine, E. S. Burke, Jr.; and the Robador of Robert Law, Jr. These five outstanding pleasure craft are products of the Newport News Shipbuilding & Drydock Company. Milton Ray and W. S. Miller, sales manager, are about ready to release a series of beautiful new booklets under the caption of "A Genie from California," featuring Ray oil burners and oil burning ranges.

Federal Telegraph — To more thoroughly service the rapidly increasing number of ships whose radio telegraph and radio compass equipment is controlled by the Federal Telegraph Company, new district offices and service stations have been opened at Cleveland, Baltimore, and New Orleans. Lloyd Butler, formerly with the New York office, is to direct the Cleveland office, located at 678 Rockerfeller Building; E. R. Leight is manager of the Baltimore office at 10 East Center street; and W. R. Drummey is in charge of the New Orleans branch at 109 Tchopitoulas Street. According to a Federal Telegraph Company announcement, during the coming season it is estimated that about fifty vessels of the Great Lakes alone will install new Kolster radio compasses.

Albert F. Zipf—George O. Williams, president of the Williams Line, announces the appointment of Albert F. Zipf as vice-president and Pacific Coast manager. With headquarters in San Francisco. Zipf succeeds Fred C. Bennett, who recently resigned.

V. W. Hoxie—In his position as chief of the marine department of the Babcock & Wilcox Co., Hoxie recently made a trip to the Hawaiian Islands. His many friends are as one in hoping that he had a pleasant visit.

P. T. A.'s Sixth Banquet—Taking another step forward toward the front ranks of organization, the sixth annual banquet of the Pacific Traffic Association, held in San Francisco, an enthusiastic meeting a noteworthy gathering, both from the standpoint of the addresses and the entertainment. Dr. Eliot Jones of Stanford University and Clay Miller, president of the San Francisco Chamber of Commerce, were the principal speakers. Austin Sperry and Charles Bulotti added their voices in vocal contributions to the entertainment of the evening. Sherman K. Burke was toastmaster, and J. A. Culbert was chairman in charge of arrangements. The "P. T. A." has grown to a membership of 800.

J. J. Tynan Returns Home—Following conferences with officials of the Bethlehem Shipbuilding Corporation in New York, J. J. Tynan, general manager of Bethlehem affairs on the Pacific Coast, returned recently to his San Francisco headquarters at the Union Plant.

Bridgeport Brass.—Charles H. Clark is now raw material salesman for the Bridgeport Brass Company of Bridgeport, Connecticut, covering Massachusetts and the cities of Providence, Rhode Island, and Meriden, Connecticut. He joined the Bridgeport staff after being connected with John Tredennick, Inc., of Boston, coal dealers, for whom he sold coal to the Bridgeport Brass Company. Clark is widely known throughout New England and is thoroughly acquainted with conditions in his new field.

Luckenbach Line—H. C. Cantelow, vice-president of the Luckenbach Steamship Company, announces the following appointments, effective May 5: M. J. Wright, district manager at Seattle, is to be transferred to San Francisco, where he will serve as Pacific Coast manager, vice Zac T. George, who was recently named Pacific Coast traffic manager. Paul D. Chandler, district manager at Los Angeles, will succed Wright at Seattle. H. C. Ewing, general freight agent at San Francisco, succeeds Chandler at Los Angeles.

WEEKLY INTERCOASTAL SERVICE

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Coastwise
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Freight
and
Passenger

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A national organization operating 73 vessels Coastwise and Intercoastal provides the shipper of goods with a thoroughly dependable service. For the lumber trade, the mill has been brought to the market through the medium of this transportation system. McCormick lumber distribution is world wide.

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SAN FRANCISCO, LOS ANGELES—NEW YORK, PHILADELPHIA and BOSTON

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PUGET SOUND AND COLUMBIA RIVER PORTS—NEW YORK, PHILADELPHIA, BOSTON
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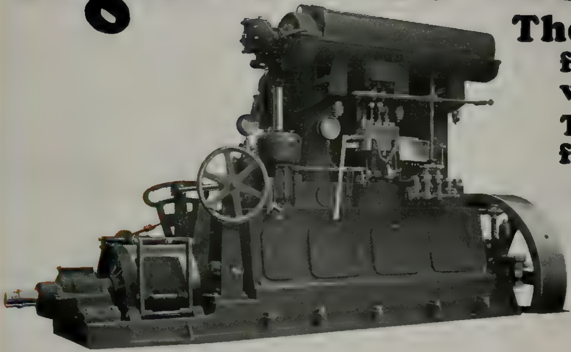
Pacific Marine Review

The National Magazine of Shipping

JUNE, 1926

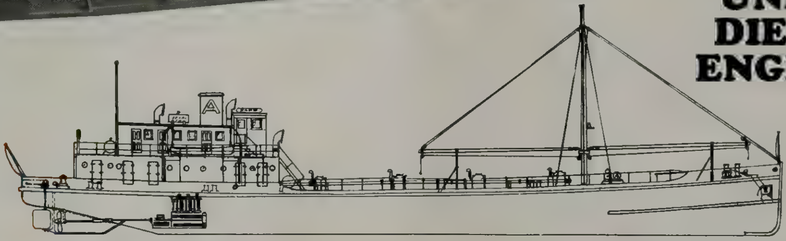
UNION

Again-for Associated



The Associated Oil Co.'s first tankers were powered with Union gas engines

The new refined oil carrier for the Associated Oil Company now building at the Union plant of the BETHLEHEM SHIPBUILDING CORP., Ltd. will be equipped with UNION DIESEL ENGINES



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OAKLAND, CALIFORNIA, U.S.A.

Established 1885

Official Organ
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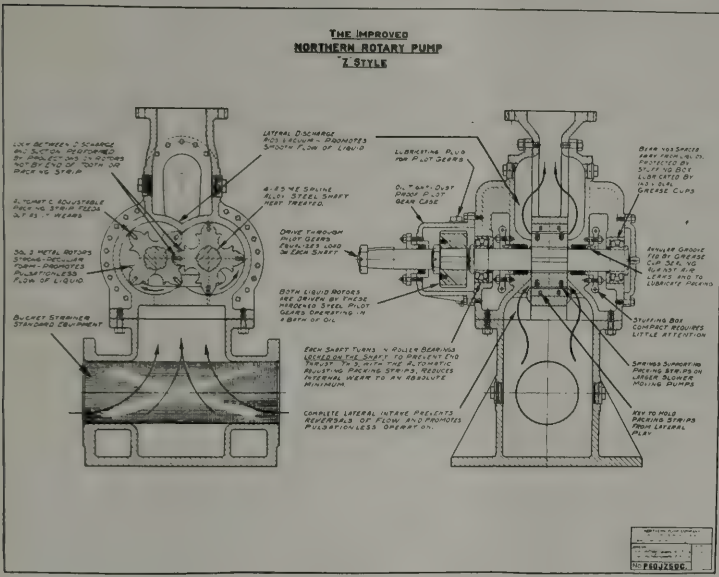
Pacific Marine Review, Vol. 23, No. 6, Published Monthly at San Fancisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

The Improved Northern Rotary Pump


THE IMPROVED
NORTHERN ROTARY PUMP
"Z" STYLE
LOCK BETWEEN DISCHARGE AND SUCTION PERFORMED BY PROJECTIONS ON ROTORS NOT BY END OF TOOTH OR PACKING STRIP
LATERAL DISCHARGE AIDS VACUUM - PROMOTES SMOOTH FLOW OF LIQUID
AUTOMATIC ADJUSTABLE PACKING STRIP FEEDS OUT AS IT WEARS
4-BASE SPLINE ALLOY STEEL SHAFT HEAT TREATED.
SOLID METAL ROTORS STRONG-PECULIAR FORM - PROMOTES PULSATIONLESS FLOW OF LIQUID.
DRIVE THROUGH PILOT GEARS EQUALIZES LOAD ON EACH SHAFT
BOTH LIQUID ROTORS ARE DRIVEN BY THESE HARDENED STEEL PILOT GEARS OPERATING IN A BATH OF OIL
BUCKET STRAINER STANDARD EQUIPMENT
LUBRICATING PLUG FOR PILOT GEARS
OIL TIGHT-DUST PROOF PILOT GEAR CASE
BEARINGS SPACED AWAY FROM LIQUIDS. PROTECTED BY STUFFING BOX LUBRICATED BY INDIVIDUAL GREASE CUPS
ANNULAR GROOVE FED BY GREASE CUP SEALING AGAINST AIR LEAKS AND TO LUBRICATE PACKING
STUFFING BOX COMPACT REQUIRES LITTLE ATTENTION
EACH SHAFT TURNS IN ROLLER BEARINGS LOCKED ON THE SHAFT TO PREVENT END THRUST. THIS, WITH THE AUTOMATIC ADJUSTING PACKING STRIPS, REDUCES INTERNAL WEAR TO AN ABSOLUTE MINIMUM.
SPRINGS SUPPORTING PACKING STRIPS ON LARGER SLOWER MOVING PUMPS
COMPLETE LATERAL INTAKE PREVENTS REVERSALS OF FLOW AND PROMOTES PULSATIONLESS OPERATION.
KEY TO HOLD PACKING STRIPS FROM LATERAL PLAY
NORTHERN PUMP COMPANY
No P60JZ6DC.

NOTE

(a) Drive from pilot gear end, giving equal distribution of load on both shafts, resulting in quiet operation and freedom from vibration.

(b) Roller bearings locked on shafts, preventing end thrust with use of packing strips reducing internal wear to a minimum.

(c) Strainer in suction base—easily removable for inspection or cleaning.

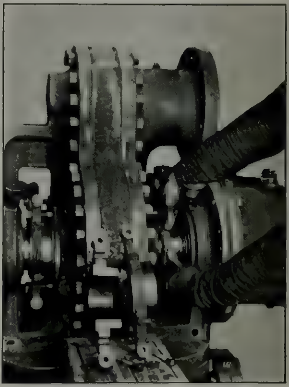
(d) Large stuffing boxes—easily accessible.

(e) Lateral intake and discharge resulting in high efficiency.

(f) Adaptability to motor speeds.

As a result of suggestions from operating and supervising engineers in the marine field, we have brought out an improved Northern Rotary Pump embodying those suggestions. All possible "troublemakers" have been eliminated, with the result that we are offering a pump that has been tested out in actual marine service and remodeled to meet the exacting requirements of this service.

Our guarantee simply expressed means that the customer must be absolutely satisfied. We stand behind our product. Ask any Northern user.



A simple split gland with plenty of hand room makes repacking an easy job on the improved Northern Rotary Pump

NORTHERN PUMP CO.

Division of Northern Fire Apparatus Co.

MINNEAPOLIS, MINNESOTA

Pacific Coast Representatives

King-Knight Co.

Seattle San Francisco Los Angeles

Pacific Marine Review

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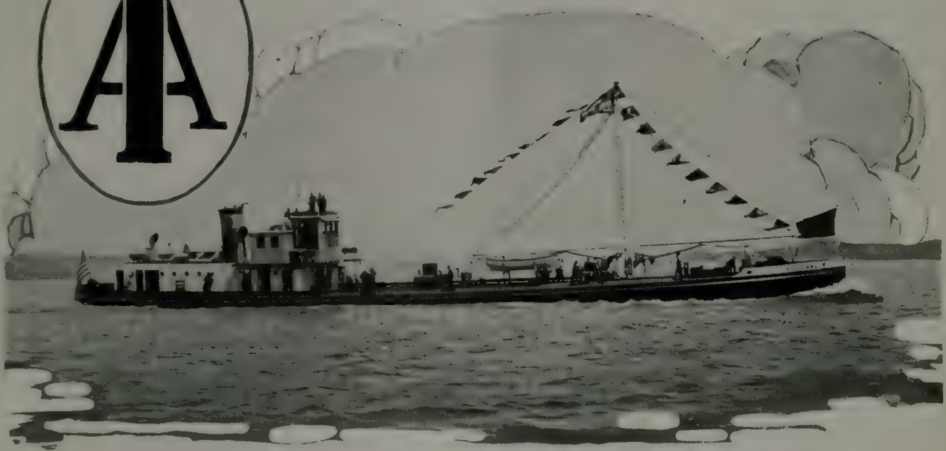

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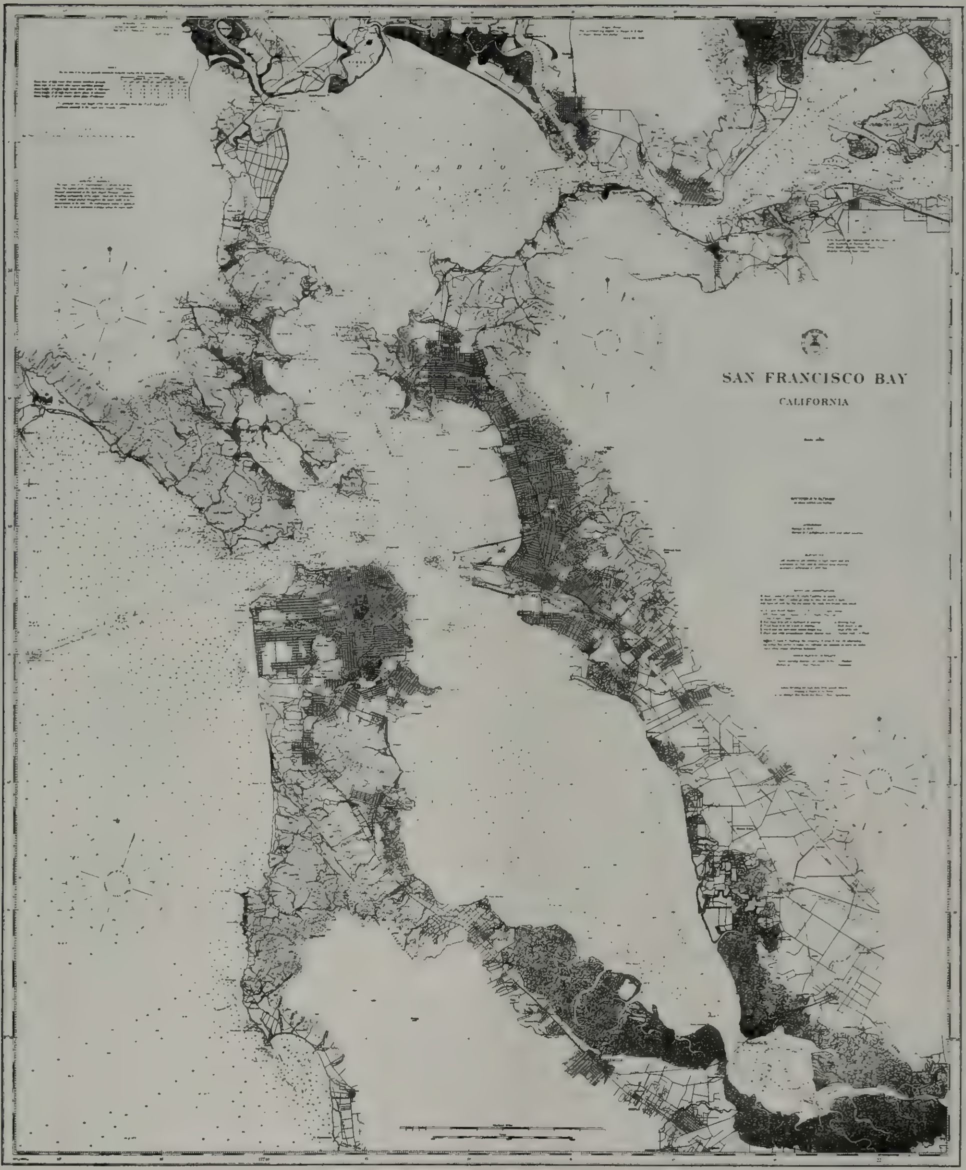

San Francisco Bay

Center of shipping, population and industry of the Pacific Coast, San Francisco Bay embraces forty ports and provides along its placid shores facilities for ship building and ship repairing excelled by none in the nation. San Francisco Bay is forty miles long and from three to twelve miles wide and has as its hinterland rich and productive valleys. The romance of its history and the potentialities of its future will always hold the attention and interest of those who live by or for the sea.

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JUNE 1926 VOL. XXIII., No. 6

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Official Organ
Shipowners' Association of the Pacific

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S. Hines.
Published on the 25th of each month preceding the publication date.
Advertising and editorial forms close on the 15th.
Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

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Editor.

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Advertising Manager

Ship Repairs at San Francisco

PACIFIC MARINE REVIEW has often directed the attention of shipping men to the extraordinary facilities provided at San Francisco for the drydocking and repair of ships. The word extraordinary is here used advisedly, for the docking facilities on San Francisco Bay are of greater capacity in proportion to the tonnage using that harbor than are these facilities in any other harbor in the United States, and possibly in the world.

During the present century no ship has entered the Golden Gate that could not have been docked and repaired on a San Francisco Bay dry-dock. At the present time no ship afloat on the seven seas is too large to be handled on a San Francisco Bay dry-dock. In this connection we have been furnished some interesting figures by the Pacific Coast Dry Dock Association.

The four major ship repairing and ship building establishments on the Bay of San Francisco own and operate marine railways with a combined hauling-out capacity of 40,000 tons; floating docks with a combined lifting capacity of 39,000 tons; and two graving docks at Hunter's Point whose weight capacity is unlimited and whose physical dimensions place them among the largest commercial dry-docks in the world and the largest in America. The smaller dock at Hunter's Point is 750 feet long by 103 feet 6 inches wide at the coping, and has 29 feet of water over the keel blocks. The large dock is 1020 feet long by 150 feet wide at the coping, and will take a vessel drawing 40 feet of water.

It is interesting to note that in 1925, a very quiet year, these four establishments had a combined average personnel list of 2128 men, to whom they paid in wages a total of $4,282,055. The total value of the products of these establishments in 1925 was $9,013,630. These figures are especially significant in showing that the shipbuilding and repairing industry disburses a very high proportion of its receipts in the form of wages, the proportion here being nearly 50 per cent. This fact should commend this industry very highly for the support of government.

The figures given above include such new shipbuilding as was done in these plants during 1925. They do not represent the total for the San Francisco Bay district; but only the work done by the four major establishments holding membership in the Association. The several establishments outside this membership could show an additional respectable total and there would have to be added also the work in wooden workboats, yachts, cruisers, tugs, and barges. It would probably be a safe and conservative estimate to say, in round numbers, that there are 3000 men constantly employed at this work at the present time and that the annual pay roll is $6,000,000 and the annual products value $12,000,000.

The investment in plant back of this industry is, in round numbers, not far from $35,000,000. The net returns on such an investment at the present volume of business are practically nil.

The bidding on all ship work is highly competitive. Shipowners, particularly those engaged in the intercoastal trade, will find decided advantage in the prompt execution of routine and extraordinary conditioning and repairs that accrue to the users of these San Francisco Bay facilities on account of the availability of efficiently operated plant equipment of large capacity.

Savings in vessels' time mean big money to shipowners.

San Francisco's dry-dock plant assures such savings to those who take advantage of the opportunity offered.

The American Merchant Marine

THE quarter ending March 31, 1926, marked a significant change in the status of the American government-owned merchant fleet. During that quarter, for the first time since the close of the war shipbuilding program, the privately-owned American merchant fleet exceeded fifty per cent of the total and overshadowed the government fleet in actual bulk and capacity.

American privately-owned seagoing vessels, as of April 1, 1926, had an aggregate gross tonnage measurement of 5,622,470. More than 92 per cent of this total was in active service. At the same date the United States Shipping Board fleet had an aggregate measurement of 5,306,215 gross tons. About 33 per cent of this fleet was in active service. During the quarter mentioned, 62 vessels were delivered to purchasers by the Shipping Board and 6 vessels were returned by purchasers to the Board.

Thus we are gradually working the Federal Government out of the merchant shipping business. The rate of liquidation for the Shipping Board fleet is gradually increasing, and will continue to increase as the fleet grows smaller.

The fact that over fifty per cent of the total American merchant fleet is now owned by private citizens and is being energetically used by those citizens is a distinct sign of progress and cause for congratulation.

Fuel For Diesel Engines

PROSPECTIVE users of diesel engines are often made nervous over the necessary investment by warnings broadcasted by government geologists and others to the effect that at present rates of consumption available supplies of fuel oil will last only a few years. Unquestionably this nervousness has hindered wide employment of the diesel engine as a prime mover.

In an article published in the Compressed Air Magazine for June 1926, J. O. Lewis, former chief of the Petroleum Division of the United States Bureau of Mines, sums up the situation as follows:

"Supplies of cheap flush oil from new pools cannot be counted on to meet all demands for many years to come; other undeveloped sources of supply are incomparably greater than the resources from which oil has been obtained up to this time, and these latent resources should meet all our more essential needs indefinitely—among these needs being fuel oil for oil engines; and, when it becomes necessary to rely on these latent resources, higher, yet not excessively high prices may be expected for petroleum products. Higher prices at such times will, no doubt, cause many users of cheap fuel oil to revert to the use of coal or to other alternative sources of heat and power. Even so, the oil engine will have such a margin of advantage over the other users of fuel oil that it will be able to compete successfully for supplies under well-nigh every conceivable contingency."

Mr. Lewis goes on to show that there are numerous latent sources of supply. Among these he lists, first, increased importations of crude oil from foreign sources, principally South America, where large new fields have been barely scratched; second, improved methods of recovery from domestic fields; third, distillation from oil bearing shales; fourth, low temperature distillation of low grade soft coals.

This view of future sources of liquid fuel supply; namely, that they are practically inexhaustible but of such a nature that there will be a gradual increase in cost, places the diesel engine manufacturer and the diesel engine users in a strong competitive position. The competition will ultimately be with coal and with hydro-electric power, and "the diesel engine with its superior operating economy will be the last prime mover using oil as fuel to be forced out of service."

New Japanese Tariff

EFFECTIVE March 29, 1926, Japan is imposing new tariff schedules on goods arriving on or after that date. The new schedule does not make any alteration of the general tariff system. Practically all of the duties are specific and are levied on the net weight of the goods. There are some ad valorum duties and these are assessed on c. i. f. values at the time of importation.

The new tariff reflects the desire of the government to protect local industries from foreign competition and to further the governmental program of self-sufficiency in materials and manufactured products essential to national defence. The increases are wholely on chemicals, textiles, machinery, and other manufactured products. Practically all raw materials remain free of duty or are carrying lower rates than formerly and, in the case of partially manufactured goods not successfully produced in Japan, former rates have been maintained.

All American exporters to Japan markets should study this new tariff very carefully. Complete schedules are on file at the offices of the United States Bureau of Foreign and Domestic Commerce and are available for all interested parties.

Foreign Traders at Charleston

THE thirteenth annual convention of the National Foreign Trade Council was held in Charleston, South Carolina, April, 28, 29, and 30 last. This gathering brought to the charming old southern city and modern bustling seaport delegates from all parts of the United States and from practically every country in the world.

In the final declaration issued by this convention, the National Foreign Trade Council finds that the foreign trade of the United States for the calendar year 1925, measured by value and volume, was the largest of any normal year. It exceeded in value that of 1924 by more than $900,000,000 and in volume by more than a million and a half tons. The increase of exports was 6.9 per cent, and the increase of imports was 17.1 per cent. This change has been accentuated in the first three months of this year. We should, however, recognize that imports of materials not readily produced here are necessary, tend to increase foreign buying, and assist our exports in finding ready markets.

World trade has nearly recovered the volume it reached in 1913, and this year it should attain pre-war basis. The loss of normal growth of international trade during twelve years is one measure of the cost of the war.

This convention welcomed the participation in its sessions by the British Dominions, and especially by our northern neighbor, who for more than a century of unbroken friendship has been one of our great suppliers as well as one of our best customers. The vast and growing trade between Canada and the United States is a striking proof of the value of such friendly relationship and an unanswerable argument for the spirit of cooperation in developing trade.

The countries which are our leading competitors in world trade, Great Britain, Canada, France, Belgium, Germany, and Japan, are the largest purchasers of our products, manufactured as well as crude. This shows that increasing activity of other nations in general trade results in increased purchases from us.

American foreign trade is in a firmer position than ever before, for our trade practice has been so improved that our competitors recognize it as standard in world commerce. We have reached the stage of expanded interest and participation which tends to diminish the risk of the whole because of wider distribution. The number of foreign traders grows as the volume of trade increases.

This situation calls for continued vigilance and activity. There are many ways in which further improvement may be made. Certain matters relating to trade procedure are wholly within the control of the traders themselves. Others call for congressional action. The American people are convinced that the maintenance of a merchant marine, privately owned and operated, is essential to both our commerce and national defense. The chief agency for the accomplishment of this purpose is the support of American ships by American importers and exporters.

Despite the continued world wide depression in the shipping business, more ships are now operating under the American flag and a larger proportion of our cargo is carried in American bottoms than at any time in the last sixty years. The surplus tonnage of all nations is gradually decreasing, through natural causes, and the volume of world commerce is steadily increasing so that the shipping industry is slowly approaching a point where the supply of tonnage will more nearly approximate cargo opportunities.

California Fish

CALIFORNIA is a wonderful state. Some of its detractors say it draws to its real estate net nearly all the "suckers" of the universe. Be that as it may, we are now assured that its sun-kissed waters attract multitudes of much more profitable fish and that the commercial fishery business of the Golden State is rapidly becoming one of her more important industries and is now among the largest in the world.

The California Fish and Game Commission is responsible for the statement that in 1925 fish were caught in adjacent waters and brought into California ports weighing over two hundred thousand tons. We wish to be accurate, we are not asserting that individual fish weighed anything like that figure; but specifically in round numbers California fishermen harvested last year 416,000,000 pounds of fish. Seventy-eight per cent of this weight was made up of sardines. Barracuda, white sea bass, yellow tail, tuna, albacore, and salmon made up the other 22 per cent.

In addition to this, San Francisco is headquarters for much of the Alaska salmon fishing, and tremendous quantities of canned salmon are marketed through that port both for domestic and foreign consumption.

Constant research work is carried on by the Fish and Game Commission to improve methods of fishing and marketing and to conserve and increase supply, and much progress is being made along conservative lines.

Seasonal Navigation

THE following circular letter was recently sent out from Washington:

U. S. Supervising, Traveling,
Local and Assistant Inspectors,
Steamboat Inspection Service.

The season of navigation has commenced and all of you are actively engaged in making inspections of vessels subject to the jurisdiction of this Service. Remember that you have a trust to perform in which the lives of the traveling public, men, women, and children, may be involved. Make your work as perfect as possible, having in mind at all times and before all things the thought of safety.

(Signed) D. N. Hoover,
Supervising Inspector General.

The spirit of this letter is commendable and it is no doubt actuated by a strong desire on the part of an earnest chief to better the efficiency of the service of which he has charge.

In the United States, however, "season of navigation has commenced" is a phrase which can apply only to a limited coastline in New England and on the Great Lakes.

On the great majority of our Atlantic seaboard and on the whole Gulf and Pacific Coast it is navigation season the year round.

For this very reason inspectors of the Steamboat Inspection Service on this coast are on the job almost ceaselessly the year round and have maintained a high record of efficiency and very low casualty rate for marine passengers.

We are always glad to see such circular letters, for they remind us very forcibly that we should be always in a kindly and grateful frame of mind that we are allowed to live on the Pacific Coast.

Death Takes William J. Brady

William J. Brady, marine superintendent of the Dollar Steamship Company, President of the Eureka Boiler Works of San Francisco, Past-President of the American Society of Marine Engineers, and an official in many lodges and clubs, passed away very suddenly during the night of May 8 at his home in Oakland.

One of the best known and best loved men along San Francisco's embarcadero, "Bill" Brady is very much missed and is sincerely mourned by many friends.

William Brady was born in San Francisco, where his father owned the Eureka Boiler Works. After serving an apprenticeship in the old Union Iron Works and on the Pacific Mail steamers, young Brady joined his father in the management of the boiler works. Much notable work both afloat and ashore was executed at these works under his supervision.

Mr. Brady is survived by his wife and by three children, Ralph E., Billy J., and Ruth B. Brady.

The Fundamentals of America's Foreign Trade

**By Norman F. Titus, Manager, Claims-Insurance,
McCormick Steamship Company.**

THE United States is a creditor nation; it produces more than it consumes. As a consequence, whether we Americans will it or not, we are committed to increased activity in foreign trade, and, by the operation of inevitable economic principles, we are destined to foresake our fetish of isolation and play an increasingly important part in international affairs.

The operation of these same economic principles is found in the life history of every great nation. At first it has to rely upon the import of machinery and other manufactured goods for the development of its natural resources. Since it is unable to pay for these imports, it becomes indebted to other countries for the amount by which the value of its imports exceeds the value of its exports. As the country develops, increasing amounts of raw materials are exported, with the result that, eventually, the country can not only pay for its imports but will also be able to pay the interest on the foreign obligations and for services rendered by foreign shipping companies, bankers, and insurance companies. This represents the second stage in its development.

The transition to the third economic stage is almost imperceptible. It consists in an increase of the export surplus to a point at which not only all obligations to foreign nations are met, but the indebtedness to foreign capital is reduced.

The fourth stage is that reached already by the great manufacturing nations of Europe; they have passed the debtor stage and have succeeded in reversing their positions and have become creditors. Here, as in the first phase of economic evolution, the imports exceed the exports, but now the excess is not due to borrowings but to lendings. The excess of imports over exports represents largely the payment of interest on capital invested in foreign countries.

From an economic standpoint, we find in this development that during the first phase there is an unfavorable trade balance—more imports than exports; in the second and third phases, there is a favorable trade balance; that is, more exports than imports; while during the fourth and last stage we find a return to the unfavorable trade balance.

The United States was in the second phase prior to the World War, but during the progress of the war passed through the third phase. At present we are on the threshold of the fourth aspect.

Position of United States.

What then is the true meaning of this position of the United States, and what is the actual status of its foreign trade? There seems to be a general impression that this business of foreign trade is rather new and that we are mere tyros at the game, and that we have a long way to go to equal the trade activities of the older nations. As a matter of fact, expressing the totals in dollars, at yearly average rates of exchange, the foreign trades of the great nations of the world in 1925 were as follows:

Great Britain	$10,123,000,000
United States	9,137,000,000
France	4,440,000,000
Japan	2,000,000,000

Thus we see that the United States is pressing Great Britain for world leadership and is far from being a pigmy among world-trading giants. Furthermore, in examining these figures, it is also necessary to keep in mind that world-wide trade is a modern phenomenon. A hundred years ago world trade consisted chiefly of luxuries—teas, spices, silks, etc. People of those times lived on the products of their own vicinity. Today an entirely different situation prevails; the very necessities of life, even those of the poorest classes, are brought from the most distant corners of the world. Manchurian beans are sold in Germany; the English laborer serves Australian mutton or Argentine beef on his table; the huckster in San Francisco peddles bananas from the West Indies; wheat and ore are shipped half around the world. The foreign trade of the United States last year was double that of the entire world a hundred years ago.

Interesting Facts.

Furthermore, a more careful scrutiny of the foreign trade of the United States reveals many interesting facts. Disregarding the shifting value of currencies, we find that expressed on a quantity basis instead of a monetary basis, the export trade of the United States in 1925 exceeded that of 1913 by 37 per cent. On the same basis, import trade of 1925 was 60 per cent above 1913. A further significant fact is that in none of the European combatant nations has exports upon a quantity basis exceeded their pre-war footing. This increase in our trade cannot be laid to natural resources alone, nor to noncompetitive goods, neither to some fortutitous cause. Our exports of manufactured goods—our most competitive group—have expanded even faster than the other groups in our trade; yet our factories pay the highest real wages in the world.

There are many reasons for our present position in world trade. In the first place, our resources are such as will enable us to hold a commanding place in the future development of international trade. We have over one-half of all the known coal of the world and two-thirds of the world's cotton. Stating these facts in another manner, while we have only 7 per cent of the world's land and only 6 per cent of the world's population, we produce over 50 per cent of the world's supply of basic raw materials and grains. For example, of the world's materials we produce approximately as follows: 25 per cent of the wheat, 40 per cent of the iron and steel, 40 per cent of the aluminum, 60 per cent of the copper, 65 per cent of the cotton, and 65 per cent of the oil.

Efficiency and Economy.

Moreover, there are other reasons for our almost unique progress in world trade. It has been due, unquestionably, to certain distinctively American accomplishments; and in these accomplishments lie our confidence and hope for the future. Our expansion of foreign trade is a part of our domestc progress, both socially and economically. In this progress might be mentioned first the accumulative value of the intensified education, both elementary and advanced, of the American youth during the last twenty-five or thirty years. During this period our students in institutions of higher learning have increased 400 per cent. Today we have more than all the rest of the world. We have trained technical personnel upon a scale vastly larger than that of any other nation in every avenue of production and distribution. This has produced a great advance in business organization and, what is tremendously important, it has greatly increased our adaptability to new ideas. The education of our working people and our six hundred or more institutions for industrial research have been large contributing factors. Efficiency and scientific management are the order of the day. While the human factor has become recognized as the vital one in business, methods have not been overlooked. There is a great and cooperative movement in American industry and commerce for eliminating waste in a thousand directions through improved business practice—through simplification of processes and methods. Furthermore, we have had a remarkable advantage, which we must not overlook, in that by volume production, made possible through a great domestic market, we have been able by repetitive processes to apply every advance toward the production of standard commodities of high quality and low cost.

It is these factors of efficiency, economy, and scientific management that render it possible for us to sell goods of high quality, produced under the highest real wages in the world, in competition with goods produced under lower standard of living.

Standard of Living.

An analysis of world trade shows that it is constantly growing with increasing population and increasing standard of living. The significance of this is remarkably illustrated in the case of our trade with the Orient. It is only a few years since the Orient has been opened to Occidental trade; but in this short space of time trade has increased so that now Japan consumes annually four dollars worth of American goods per capita. Contrast this with China with a per capita consumption of twenty-three cents, and India, eighteen cents. Imagine, if you will, America's Oriental trade when China and India raise their standards of living and purchase from us the same ratio as Japan now does. This clearly illustrates that we are not compelled to increase our trade solely at some competitor's expense.

As a corollary of this proposition, a considerable part of the imports of each nation—and, therefore, the trade of the world—consists of goods which a nation cannot itself well produce. This means that a large part of world trade consists of goods noncompetitive with domestic production. Turning, however, to American foreign trade, we find the great problem is the export of goods in which we compete with other nations. Here our measure of success is not to be gauged by driving out our competitors or destroying them, but rather in securing our share of the increase of world trade. Along this line, it is interesting to note in the report of our trade for 1925 that exports of manufactured articles, not including flour and other manufactured foodstuffs, comprised more than one-half of our total exports. This is a tremendously significant fact, for as our population increases we shall consume more of our foodstuffs, and this important item of our exports will tend to decrease because our easily cultivable land is now well occupied. If we are to maintain the total volume of our exports and, consequently, our buying power for imports, it must be by steady pushing of our manufactured goods.

When we speak of the fundamentals of our foreign trade and consider especially this necessity for developing our exports in manufacture, we are quite apt to become alarmed at some of the tales we have heard of foreign competition, especially on such points as low prices and long credits. There are many other factors that present themselves, but these two are typical; let us examine them.

Quality Competition.

It is true that competition is based on price in a few lines of staple goods, but, generally speaking, we find that both cheap and expensive goods, are sold. For instance, Germany has long been looked upon as the great source of cheap cutlery; notwithstanding this, prior to the war, an American cutlery manufacturer used to sell high grade, expensive tailor's shears and other specialties to Germany because the Germans made nothing as good as his brand. This subject could be amplified indefinitely, but the gist of the matter is that a large part of America's trade is based on quality goods. In every city the world over both high priced and low priced goods are bought and sold. This applies to domestic as well as foreign trade. Quality and novelty are telling factors in influencing orders in any part of the world.

One of the fallacies commonly occuring in casual discussion of foreign trade is that which contrasts American cash terms disadvantageously with European long credits. As a matter of fact, the so-called long credit terms of Europeans have been generally confined to the piece-goods and agricultural machinery trade. In the latter, American manufacturers also have frequently extended credit facilities and centainly, in view of the universal sale of American agricultural machinery, have not suffered through failure to compete in any respect with Europeans. In reality the so-called American "cash" terms are really the customary limit of three or, at the most, four months' time for payment for goods. These are more often than not demanded by our European competitors. The exceptions to the rule are frequently cases of extension of credit in a reckless and indiscriminate manner.

Concerning this general matter of trade technique, we may derive considerable satisfaction from the fact that while Americans, as a whole, are not the best traders in the world, due to a number of beginners in the business, nevertheless it is true that the best traders in the world are Americans. The record of the United States Steel Corporation, Standard Oil Company, Singer Sewing Machine Company, International Harvester Company, and many others is abundant proof of this statement.

The Balance Sheet.

What has been outlined heretofore are the fundamentals of this business; but, after all, what the business man wants to know is not how much was bought and sold but what of the balance sheet; that is, the real story. Here we find much interesting and illuminating information. For instance, we are told by economists that America's favorable trade balance for many years has been fictitious. In order to get at the real situation let us examine very briefly the international balance sheets of Great Britain and the United States. For illustration, let us take Great Britain's statement for 1913, the last year of normalcy, and the balance sheet of the United States as of January 1, 1926, indicating just where we stand now as a result of the influences of the economic forces exerted upon us since the World War.

International Balance Sheet of Great Britain in 1913.

(In millions of pounds sterling)

Credits.		Debits.	
Exports of merchandise	430	Imports of merchandise	678
Re-exports (foreign mdse.)	103	Imports of bullion	71
Exports of bullion	64	Capital invested abroad	170
Income from investments	178	Earnings due foreigners	15
Earnings of shipping	100		
Banking and business earnings	55		
	931		934

The significant features of this balance sheet are:

(a) The items of exports and imports are measured accurately; the others are "invisible" items, represented only by pieces of paper passing through the mail, but these are, pound for pound, of equal importance.

(b) The inflow and outflow of bullion are large items, but nearly balance; in other words, England has acted as a clearing house for the payments of the world's debts and the distribution of the world's gold.

(c) In this period England re-invested in other countries most of the great sum due in interest and dividends. The English investor may be pictured as receiving a dividend check from the United States or South America and as mailing it back instead of cashing it, asking that it be added to the capital sum of his investment.

Summing up the situation, England, you will notice, bought much more goods than she sold, but she evened matters up by acting as banker, shipowner, insurance underwriter, and investor for a large part of the world. Most nations were paying invisible tribute to her.

Turning now to the United States, we find an equally interesting situation, but one that requires an examination of conditions prior to the war and today.

International Balance Sheet of United States Before the War.

(In millions of dollars)

Credits.		Debits.	
Exports	2000	Imports	1500
Bullion shipments	30	Shipping freights	25
Foreign investments	40	Immigrant remittances	150
		Tourist expenses	170
		Interest and dividends	225
	2070		2070

This statement, interpreted, means that our "favorable" balance was dissipated by immigrant remittances and travel expenses of Americans and by payments to foreign shipowners, bankers, and insurance underwriters. In other words, we were actually a debtor nation, bound to export more than we could import from the rest of the world in order to meet our obligations.

In the few years since the war the situation has materially changed, as evidenced by the following.

International Balance Sheet of United States as of Jan. 1, 1926.

(In millions of dollars)

Credits.		Debits.	
Exports	4934	Imports	4268
Interest	515	Shipping freights	8
Motion picture royalties	75	Tourist expenditures	560
Sale of securities	321	Charitable expenditures	50
Foreign bonds paid off	140	Immigrant remittances	310
Bullion	131	Foreign loans	920
	6116		6116

This very revealing statement shows that we are nearly out of the clutches of the foreign shipowners, that we are great spenders of our wealth, and, above all, that we are now the bankers of the world.

Probably one of the most significant deductions to be drawn from these statements is that to occupy our proper position in the world, both commercially and politically, our merchant marine must be fully encouraged and supported in order that our merchants may receive greater and more confidential shipping support and our country freed from paying tribute to foreign shipowners.

In a great war, under Abraham Lincoln, we learned that no nation can exist half slave and half free; in a greater war—the World War—we learned that no nation can exist half slave and half free commercially, any more than it can physically. And another great lesson of the World War is this—that no nation can become truly great, or can become an important factor in international affairs, unless it is also great upon the sea.

In conclusion, therefore, let us predict that America will lead the world, not by lowering wages, with a consequent production of cheap goods and lower standards of living, but by increasing the general education of the workers and a sharper training of the technicians, by the elimination of waste, improvement in transportation, by cultivation of scientific research, and by constant scientific improvement in our business administration both at home and abroad.

The Diesel Conversion Program

A Statement Prepared for Pacific Marine Review by the Technical Staff of the Emergency Fleet Corporation

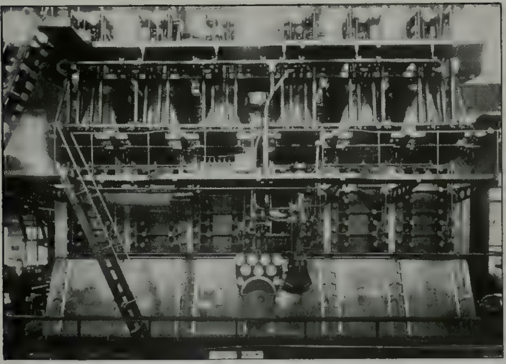
IT is doubtful if any more difficult administrative engineering task has been attempted in this country for some time than to carry out under government handicaps and under competitive bids a program as highly technical and as purely experimental as is that of the diesel program of the Shipping Board.

Fourteen vessels are involved in the first step of the program and a total of over 45,000 brake horsepower is to be developed, which includes both main engines and auxiliaries, and all auxiliaries are to be motor driven.

Practically no engines of the size required for the main motive power had ever before been constructed in the United States for marine purposes. Even the auxiliary generators are to be fitted with "oversized" compressors for supplying high pressure air to the main engines in case of emergency, thus involving a new and virtually untried feature for our engine builders.

The invitations to bids had to be so drawn as to specify the horsepower desired, the limiting revolutions and mean indicated pressures, but leaving such important features as fuel consumption, the time of delivery, and other important details to be guaranteed by each engine builder. This was necessary in order that all the established and qualified builders could bid on their particular proprietary type of engine, thus securing the widest possible competition.

Also, in the interest of developing the maximum amount of country-wide interest, it was highly desirable that the distribution of the awarded contracts should cover the greatest possible geographical area. Until all this had been settled, it was of course not possible to specify a contract for the great quantities of auxiliary apparatus, such as winches, pumps, and electric motors, and the delivery dates of all this equipment had to be synchronized with those of the main engines.



The McIntosh & Seymour 6-cylinder, 4-cycle, single-acting 3000-horsepower disesel engine on the test stand at the Auburn Works. Three of these engines are now building for the United States Shipping Board conversion program, together with a fourth by the same company, which is of the double-acting type. These engines are built with a separate diesel-driven compressor.

On the thirty-day nonstop run at full power and at 95 revolutions a minute, the combined compressor and engine units averaged the remarkably low fuel consumption of 0.409 pound per brake horsepower. This was especially remarkable because of the low grade of fuel used, which had a B.T.U. content of 17,000, with some samples testing as high as 4.5 per cent of sulphur, and also because of the low temperatures maintaining at the time of test.

Since the funds to finance this program were all federal money, it was necessary to purchase all this mass of mechanism with the maximum possible competition. The consequence of this can only be appreciated when it is understood that the industry was literally starving to death at the time the contracts were placed. Accordingly, the quite natural inclination of all builders was to bid on engines and equipment of that size and weight that could be constructed at the least possible cost. Under such circumstances it is easy for engineers and shipping men to conceive of the strain and tension on the small technical staff of the Shipping Board to assure that the government receive for its money in every case a specification article and one thoroughly acceptable to meet the needs of the service intended. Only a most carefully selected inspection force of high ideals, sound judgment, and wide experience is at all adequate for such an occasion. The problem of maintaining a high morale in this small force has naturally been made much more difficult by the above mentioned very wide distribution of the plants where the material is to be inspected and tested.

To add to all these known and inherent difficulties, the main engine builders have unfortunately been unable to meet the delivery dates that they themselves were allowed to guarantee and that they, in the best of faith, had every expectation of anticipating even. It was not an easy matter to leap from one thousand horsepower to three thousand, nor was it easy to go in one jump from an empty shop to a full shop of expert workmen.

However, the problems as they inevitably arose have been attacked vigorously and competently by the engine builders, and shop tests of the resulting products appear to indicate thus far that most of the difficulties have been very creditably overcome. Nevertheless, the consequent delay has been material, sometimes as much as nine or ten months, and it must fairly be laid directly at the door of an infant industry in process of passing through its growing pains.

The work of installation has yet to be done and that too will have its own peculiar problems; but there is every reason to believe that they will present no special difficulties to our experienced shipyards and that the vessels will be carrying cargoes by the first of the year 1927.

Then will come the real trial for which we have all been so keenly waiting—the trial of the actual service test. All the careful theoretical computations and all of the other compilations of engineering practice and performance of prior vessels (mostly foreign) will not be as valuable as guides for the future as the first year of actual service on the sea.

American Clipper Young Mechanic

By F. C. Matthews

THE Young Mechanic was a medium clipper ship, built at Thomaston, Maine, by T. W. Rhoades and launched February 2, 1855. She was 199:6 by 38:6 by 22:6, of 1375 tons, old measurement. The builder, attracted by the fine, graceful lines of a model which had been whittled out of a block by his young son, laid down a ship from it, hence the name given the finished product. She proved to be a fast ship and was also a good carrier.

Her owner was William C. McLoon of Rockland, Maine, and her first master Captain Freeman. Later Captain McLoon was in command. He died at Calcutta in 1865, his body being taken to Boston in the ship on her return, Captain Richardson in command. Captain Grant then succeeded on what was to be the last voyage of the Young Mechanic.

The Young Mechanic was engaged in general trade and has some fast passages to her credit. On her maiden voyage she went to Savannah and made the passage from that port to Liverpool in 17 days; in 6 successive days she covered 1730 miles. On June 3, 1862 she arrived at San Francisco in 127 days from New York, this being her only call at that port. She was 22 days to the line; crossed the parallel of 50 South, Atlantic, 47 days out; was 25 days rounding the Horn in heavy gales, losing the main-yard; had head winds in the South Pacific, being 28 days from 50 South to the equator; thence 27 days to destination in light or head winds, with 5 days of dead calms. The extreme clipper ship Spitfire reached San Francisco the same day, in the same length of passage from New York. The two ships left San Francisco within a few days of each other for Callao, the Spitfire making the run in 44 days from the Golden Gate against the 46 days of the Young Mechanic. The latter loaded at the Chincha Islands for Europe and arrived at Antwerp January 29, 1863. She sailed from Sunderland April 9 and arrived at Rio prior to June 2.

She left New York November 2, 1864 with a cargo of coal for San Francisco. In heavy gales she sprang a leak and was forced to put into St. Thomas. The cargo was discharged and sold, the ship later sailing for New York for repairs. On February 17, 1865 she put into Newport in distress with sails and yards carried away and rigging badly damaged; one man had been lost overboard in continued heavy gales. After repairs had been made she was chartered by the Tudor Company of Boston to take a cargo of ice to Madras and Calcutta; sailed from Boston May 4, 1865.

Shortly after her arrival at Calcutta cholera broke out on board and on September 9 Captain McLoon, his second mate, and three of the crew died; others were stricken but eventually recovered. Under command of Captain Richardson, the ship left Calcutta October 22 and cleared the Sand Heads November 1. She arrived at Boston January 29, 1866, her passage being reported at 88 days, a very fast run. The Antelope, of and for New York, left in company and the two met in the South Indian Ocean when 36 days out; both reached their ports of destination the same day. Six days later the Longwood, American built but then under the British flag (as was also the Antelope at that time), reached New York in 86 days from the Sand Heads so that that period appears to have been favorable for fast passages.

The Tudor Company were so well pleased with the performances of the Young Mechanic that they secured her for another voyage. Under command of Captain Grant she left Boston March 5, 1866 with a cargo of ice, pitch, kerosene, etc, for Hong Kong. In latitude 11 South, longitude 33 West, fire was discovered in the pitch stowed forward and in less than two hours the vessel was entirely destroyed. The crew took to the boats, losing all their belongings. On April 10 they were picked up by the French bark Eugene which landed them at Pernambuco the following day. The fire was supposed to be due to spontaneous combustion.

Oakland Shipyard Busy

The Moore Dry Dock Company's Plant Working on Large Program of Shipbuilding, Ship Repairing and Structural Steel

SAN FRANCISCO BAY is a very busy collection of of ports. Over forty separate and individual ports are tributary to its shore line. Trans-bay passenger and freight transportation is growing very rapidly and is continually calling for new floating equipment. The spread of industries requiring liquid fuel gives rise to a demand for bay and river tankers of light draft. The business of the harbor creates considerable business for shipbuilding plants.

The close of the war-time shipbuilding program left all Pacific Coast shipbuilders faced with the problem of finding profitable work for greatly expanded plants. One San Francisco Bay plant has to a great extent solved that problem and is forging ahead on a program of structural steel, ship construction, and ship repair work.

The Moore Dry Dock Company, located on the Oakland Estuary, with splendidly equipped yard, shops, and docks, and with a strong organization of marine engineering and naval architectural skill, is at the present time enjoying a period of hustle and bustle exceeding that of any time in the yard's history, except the war program period.

On the ways are three large jobs, on the docks and at the outfitting wharves are over twenty vessels undergoing repairs and reconditioning, in the plate shop are the details of many structural steel members for large buildings in Pacific Coast cities, as well as the last of the steel spans for the great San Francisco Bay vehicular bridge now nearing completion at Dumbarton Point.

The first construction job is the great steel carfloat for the Atchison, Topeka, and Santa Fe Railway. This road tows all its freight for San Francisco across the bay from its Richmond terminal. Wooden floats have been used exclusively in this work. These have been found rather unsatisfactory on account of hogging due to unequal loading. A hogged barge is a much more difficult tow than one whose lines are fair. The engineers of the railway company, therefore, decided to try steel and designed a barge of that material which would be of sufficient strength to take any possible loading of cars without distortion. This barge, 260 feet long, 38 feet beam, and 12 feet 6 inches depth, is now being rapidly completed at the yard of the Moore Dry Dock Company. Every effort is being made to produce a perfect job as the yard realizes that if this experimental carfloat works up to expectations, the entire fleet of wooden barges will soon be discarded and steel hulls built to do this work. The carfloat has extra heavy plating on the vertical sides and is divided into a large number of compartments by the stiffening bulkheads.

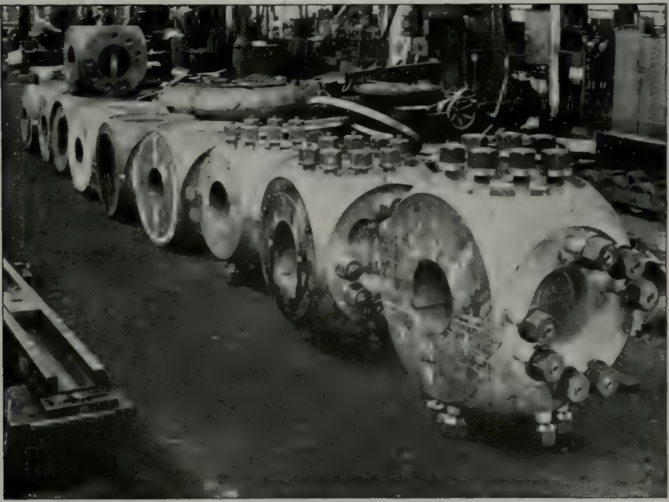
The other two jobs are the new turbo-electric drive steel passenger ferryboats for the Key System Transit Company. The daily passenger travel between San Francisco and the East Bay Cities is constantly on the increase. It amounted to over forty-five millions last year. New and larger ferryboats are constantly in demand. These two boats were designed by the firm of Hibbs, McCauley and Smith of San Francisco and are acknowledged to be the best yet in ferryboat design.

The hulls of these boats are 276 feet long and 70 feet wide over the guards. They will have a loading displacement of 2015 tons with capacity for 4000 passengers. They are double-ended and driven by two propellers, one forward and one aft. The normal shaft horsepower is 2250, giving 14½ knots an hour speed; and the maximum 2600, giving 15 knots an hour.

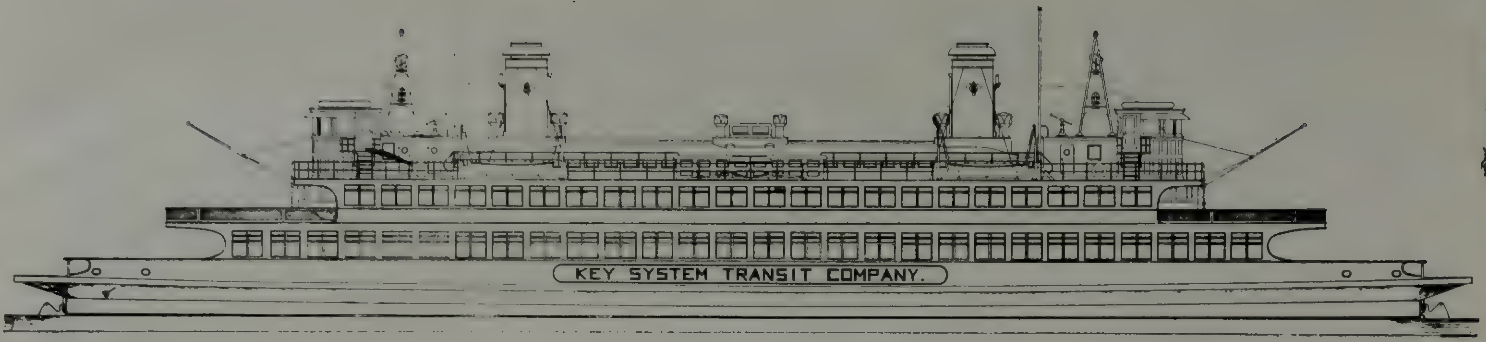
Four Babcock & Wilcox water-tube boilers will supply steam to the Westinghouse turbine connected to Westinghouse generator through reduction gearing. This generator distributes current to two driving motors, one for the bow propeller and the other for the stern propeller. Pilot house control will give the captain instantaneous control of the speed of each of these motors and of the boat. Steering control of bow and stern rudders is independent and instantaneously available in either pilot house.

Many features of the design are especially calculated to increase passenger comfort, such as chilled water for drinking fountains, specially furnished ladies' rest room, increased galley and restaurant facilities.

By a simple and effective installation of large capacity pumps, the trim of these vessels fore and aft will be under control at all times; so that even when unloading at one end, the ship can be kept on an



Propeller hubs for various tankers of the Standard Oil Company (Calif.) at the shops of the Moore Dry Dock Company.

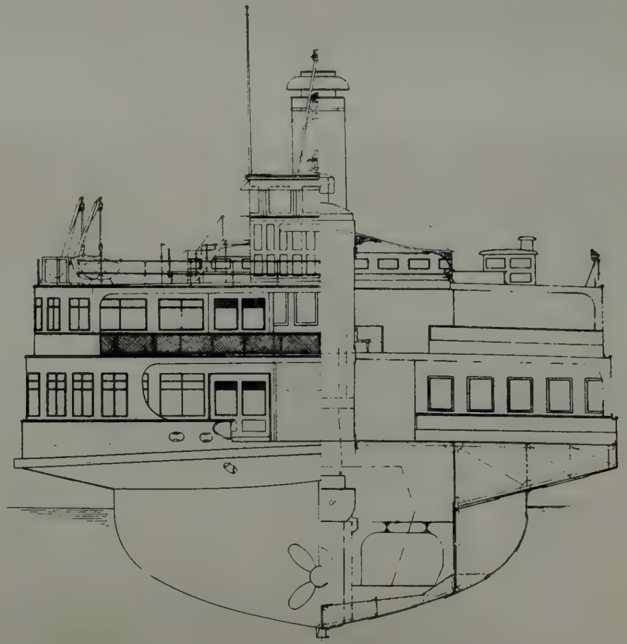


Key System Ferries Building at Oakland Yard of Moore Dry Dock Company

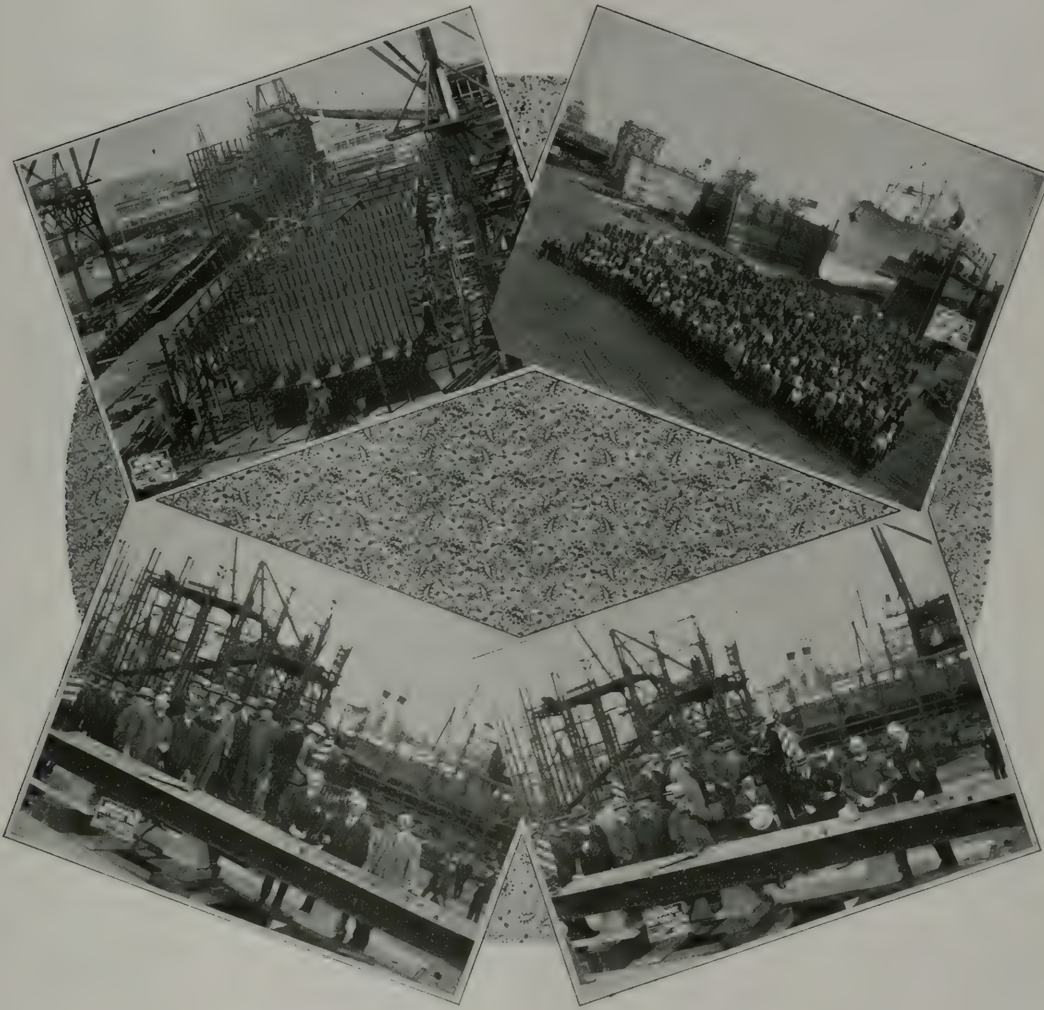
Length over all	276'0"
Length between rudder posts	256'0"
Length between perpendiculars	256'0"
Breadth over guards	70'0"
Breadth molded at sponsons	47'0"
Depth of hold	18'4"
Depth molded	21'0"
Sponson overhang	11'6"
Normal light displacement	1754 tons
Normal light draft—keel	13'7½"
Normal load displacement	2015 tons
Normal load draft—keel	14'9½"
Deadweight capacity	261 tons
Passenger capacity	4000
Seats	2340
Normal S.H.P.	2250
Maximum S.H.P.	2600
Speed (Normal S.H.P.) (Normal light displacement)	14.5 knots
Speed (Maximum S.H.P.) (Normal light displacement)	15 knots

The keels for these vessels were laid May 5, 1926. Satisfactory progress is being made on construction, and delivery will be made early in the winter.

The construction of these vessels is another index marker on the wonderful growth of the San Francisco Bay Region.



A Maytime Celebration in Moore's Shipyard



The above pictures were taken at the shipyard of Moore Dry Dock Company, Oakland, California, on May 5, 1926, at the time of the keel laying of the two turbo-electric ferryboats for the Key System Transit Company.

Upper left is a view of the steel carfloat under construction for the Atchison, Topeka and Santa Fe Railway.

Upper right is a view of the United States Army transport Somme on drydock for repairs and the employes working on this and other jobs under way at the plant.

Lower left is a view of the keel laying of the first of the new ferryboats for the Key System Transit Company, showing in the foreground the three marine engineers and naval architects who designed the boats. They are, from left to right: Edward McCauley, Frank W. Hibbs, and S. Burke Smith.

Lower right is another view of the ferryboat keel laying showing, at extreme right, Joseph Moore, president of Moore Dry Dock Company; next to him George Harris, general manager, Key System Transit Company; and. fourth from right, P. A. Cox, assistant to President Moore of the dry-dock company.

even keel. The woodwork on seats and trim in cabins will be largely of teak with rubber flooring and walls of white enamel panels.

The steering gear for these ferryboats is to be of hydro-electric operation and are to be supplied by the Hyde Windlass Company of Bath, Maine. It is of special design for installation on these boats.

There is to be a steering gear for each forward and each after rudder. The steering gears are to be capable of putting the rudder from hard-over to hard-over in eight seconds when the vessel is going ahead at full speed.

The steering gear proper consists of two cylinders with double plungers and the central line of which is to be located athwartship about seven feet forward of the rudder stock and connected to the crosshead on the rudder stock by means of connected link.

The hydraulic pumping set is located immediately forward of the cylinders and consists of Westinghouse motor operating a variable stroke pump. The pump is fitted with a pressure regulator, which automatically varies the stroke of the pump according to the pressure required to overcome resistance on the rudder. Each steering gear is fitted with the automatic follow-up mechanism and controlled by means of the Hyde electric telemotor from the pilot house.

Two electric telemotors are located in each pilot house so it is possible to control either the forward or the after steering gear from both pilot houses at will. In each pilot house is installed two Hyde electric rudder indicators, which indicate the exact position of the rudder at all times.

A complete description of these boats appeared in Pacific Marine Review for November 1925.

The organization and personnel of the Moore Dry Dock Company are eminently fitted to carry out the ship construction contracts submitted to their care. Shipowners, supervising engineers, and others having to do with repairs have long come to realize and appreciate the wonderful facilities which obtain at the plant, and these, together with the high efficiency of the foremen in charge of the work, all go to make this plant among the most reliable in America.

Joseph A. Moore is president and general manager of the Moore Dry Dock Company; A. G. Coxon is general superintendent; A. D. Grimes is marine superintendent; Arthur Carlisle is chief engineer; John Dick is naval architect; N. Levy is purchasing agent; and Alexander Grieg is chief estimator.

Steamer President Cleveland on dock for bottom repairs at Moore Drv Dock Company

As mentioned above, the plants of many Pacific Coast shipyards have facilities for a much greater volume of work than now accrues to them from the ship construction program of American shipowners; so that many of the plants have taken to the fabricating and erection of structural steel for shoreside construction in order to keep their plant and personnel busy. Some of the notable jobs for structural steel fabrication recently handled at the Moore yard include the New Jonathan Club and the Roll Storage Building, Vernon Plant of The Paraffine Companies, Inc., at Los Angeles; the Pacific Gas and Electric Company Substation No. 1, and the Central National Bank of Oakland; The Alameda High School, Alameda; extensive warehouse additions to the California & Hawaiian Sugar Refinery at Crockett; two large Bascule bridges for Sacramento County; Congregational Church and the Mercantile Trust Bank building, Berkeley; municipal pier shed for San Diego; and the Medico-Dental Building, Temble Emanu-el, Dumbarton Bridge, and a large apartment house at 1960 Broadway, San Francisco.

In addition to this, the yard is constantly engaged in regular voyage repairs and special repairs and reconditioning to many of the vessels calling at the Port of San Francisco.

This vast amount of tonnage passing continually through the plant not only keeps a large organization together for marine repairs but eleminates entirely all overhead on this class of work, thereby reducing the cost to a minimum.

Bay motor tanker Redline, built for the Union Oil Company by the Moore Dry Dock Company, Oakland, California.

Union Diesel Driven Bay Tanker

Union Gas Engine Company to Equip Shallow Draft Tanker, for Transport of Petroleum Distillates, now Building at Bethlehem Shipbuilding Corporation for Associated Oil Company

TWENTY years ago when the first bulk oil bay tankers were being constructed, Union gas engines with Union clutch and gears on twin screw installations were installed as power plants and then proved themselves to be highly efficient, economical, and dependable. Ten years ago, in the issue for March 1916, Pacific Marine Review published a full description of these tankers which were then, after ten years of strenuous service, operating 100 per cent and making sufficient showing to warrant, at that time, the caption "Most Economical Carriers."

Today the demand for this service is for the even more economical diesel, and the Union Gas Engine Company of Oakland, California, is ready to supply that demand.

The latest tanker for San Francisco Bay service is the one recently ordered from the Bethlehem Shipbuilding Corporation by the Associated Oil Company. This tanker will be propelled by twin screws driven by Union full diesel engines. The principal characteristics of this craft are:

Length over-all	166′0″
Beam, molded	38′0″
Depth, molded	9′6″
Draft, normal loaded	6′2″
Capacity of cargo tanks, bbls.	4000

The arrangement of hull compartments, cargo piping, crew's quarters, and machinery spaces will be as outlined in the plans and profile reproduced herewith. She will be built to the highest rating for the transport in bulk of the lighter distillates of petroleum. The propulsion and cargo handling machinery and windlass are being supplied by the Union Gas Engine Company.

The propulsion machinery consists of two 110-horsepower 3-cylinder Union marine diesel engines, each connected to a propeller shaft through a Union clutch and reverse gear mounted on an extension of the engine bedplate. An Union gas engine driven air compressor supplies starting and maneuvering air. This is a well-designed compact unit with a 4½-inch diameter gas engine cylinder and a 3-inch diameter air compressor cylinder, operating on and from a common crank shaft, each with 5-inch stroke. Two starting air tanks are to be installed, one in each side wing of the motor room.

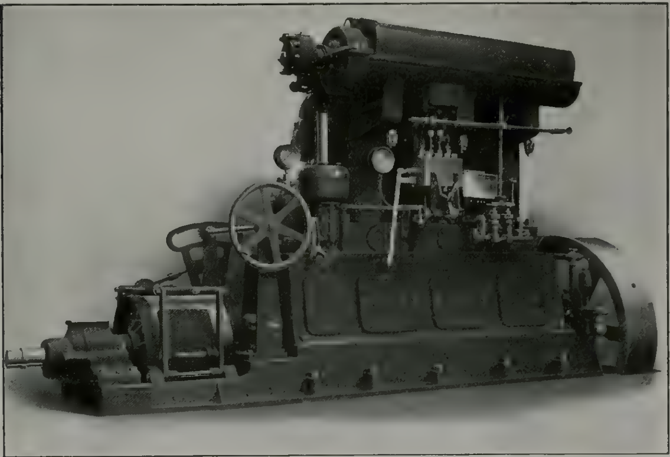
Electric lights and electric power for small auxiliaries will be supplied by a 3¾-kilowatt generator driven by a 7-horsepower Union gas engine. Another 7-horsepower Union gas engine, mounted on the main deck forward, supplies power for the double drum friction hoist, used for package cargo, and for the windlass.

The Union marine diesel was designed and developed by the technical staff of the Union Gas Engine Company of Oakland, California, to meet the demand for a sturdy dependable economical prime mover burning heavy oil that would measure up to the high standard along these lines that had long been maintained by Union heavy duty marine gas engines.

The Union diesel is of the 4-cycle mechanical injection type. No high pressure air compressor is required. This eliminates the sensitively fitted air compressor with its delicate valves and intricate connections and coolers; it removes all high pressure air piping and injection air bottles and reduces the complexity of the fuel valve.

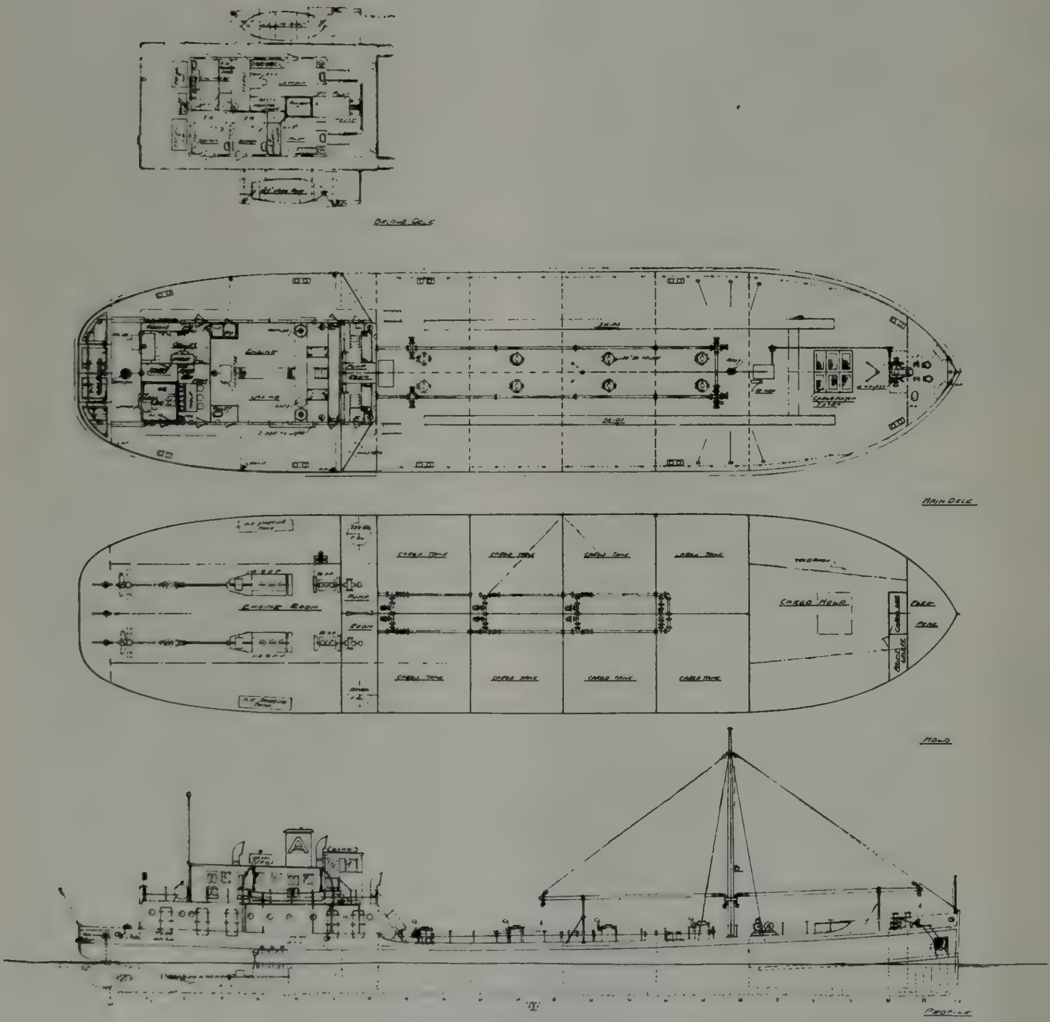
The mechanical injection fuel system of Union diesel engine is such that fuel burns as fast as it enters the combustion space. Fuel is presented to the compression heated air in a very finely divided state, so that the maximum surface of fuel comes in contact with the maximum surface of oxygen (air). Solid fuel is pumped into the fuel valve body by the fuel pump at a pressure of from 3000 to 4000 pounds per square inch. At the time desired for fuel ignition, namely, when the fuel valve is opened, the fuel stored at high pressure is forced through small orifices into the combustion space, where the pressure is approximately 400 pounds per square inch. This difference in pressure results in a very high velocity flow through the orifices, which breaks down the surface tension of the liquid fuel and causes it to enter the cylinder in the form of a vapor. Ignition is immediate, because the Union fuel system insures correct atomization. By the use of a positively controlled mechanical-injection system, the time of fuel ignition is always under control of the operator. This eliminates all uncertain and uncontrolled ignitions.

The lubricating system is of the force-feed type, a positively driven plunger pump forcing oil to the crankshaft, connecting rods, camshaft, vertical shaft, governor,

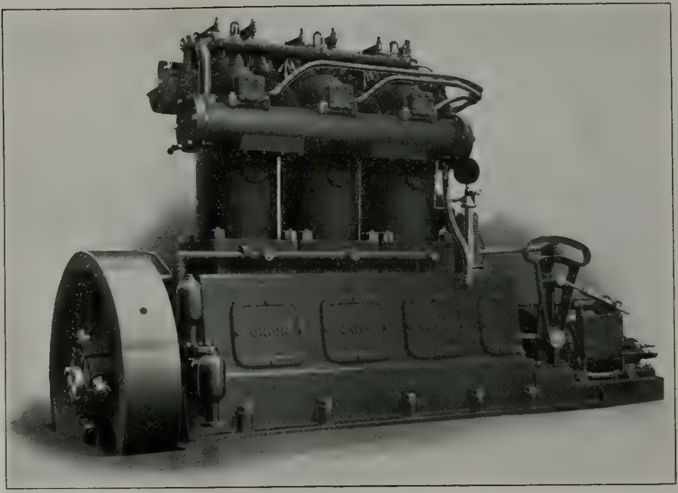


A 3-cylinder Union marine type mechanical injection 4-cycle diesel engine, starboard side.

Another Shallow Draft Motor Tanker for Associated Oil Company



Twin screw tanker for San Francisco Bay service now building at the Potrero Works of the Union Plant of the BethlehemShipbuilding Corporation.



Union 3-cylinder marine type diesel engine, port side.

and piston pins. The pressure pump delivers the oil to the main bearings, from which it passes to the crank pin bearings, then through the connecting rods and the piston pin bearings, and from there it drains to the sump. A sump pump returns the oil to the pressure pump. To keep the circulating oil free from grit and other foreign substances, strainers of ample area are provided and so installed that they may be readily removed for cleaning. By the Union force feed system, the lubricating oil consumption is kept remarkably low and hand oiling is practically unnecessary. An independent multiple force feed oiler is also provided for additional lubrication of the cylinders.

The governor is of special Union design mounted on the vertical shaft. The Union governing system varies the lift of the fuel valves and also controls the fuel pressure by a synchronized mechanism. It allows a single lever control for manual operation, and, as speed and power are increased or reduced by this lever, the fuel injection pressure rises and falls, which automatically prevents detonation in cylinders. The governor is also adjusted to instantly check racing.

The reverse gear is of the planetary or spur gear type. The gears and pinions are machined and cut from steel forgings and are heat treated. The pinions are lined with bronze bushings. The pins carrying the pinions are case-hardened and ground, and the pinions and gears run in a bath of oil and grease.

The clutch is of the multiple-disc type and capable of carrying the heaviest over-load that can be put on the engine. The brake has maple-lined shoes of ample size to hold the full reverse load.

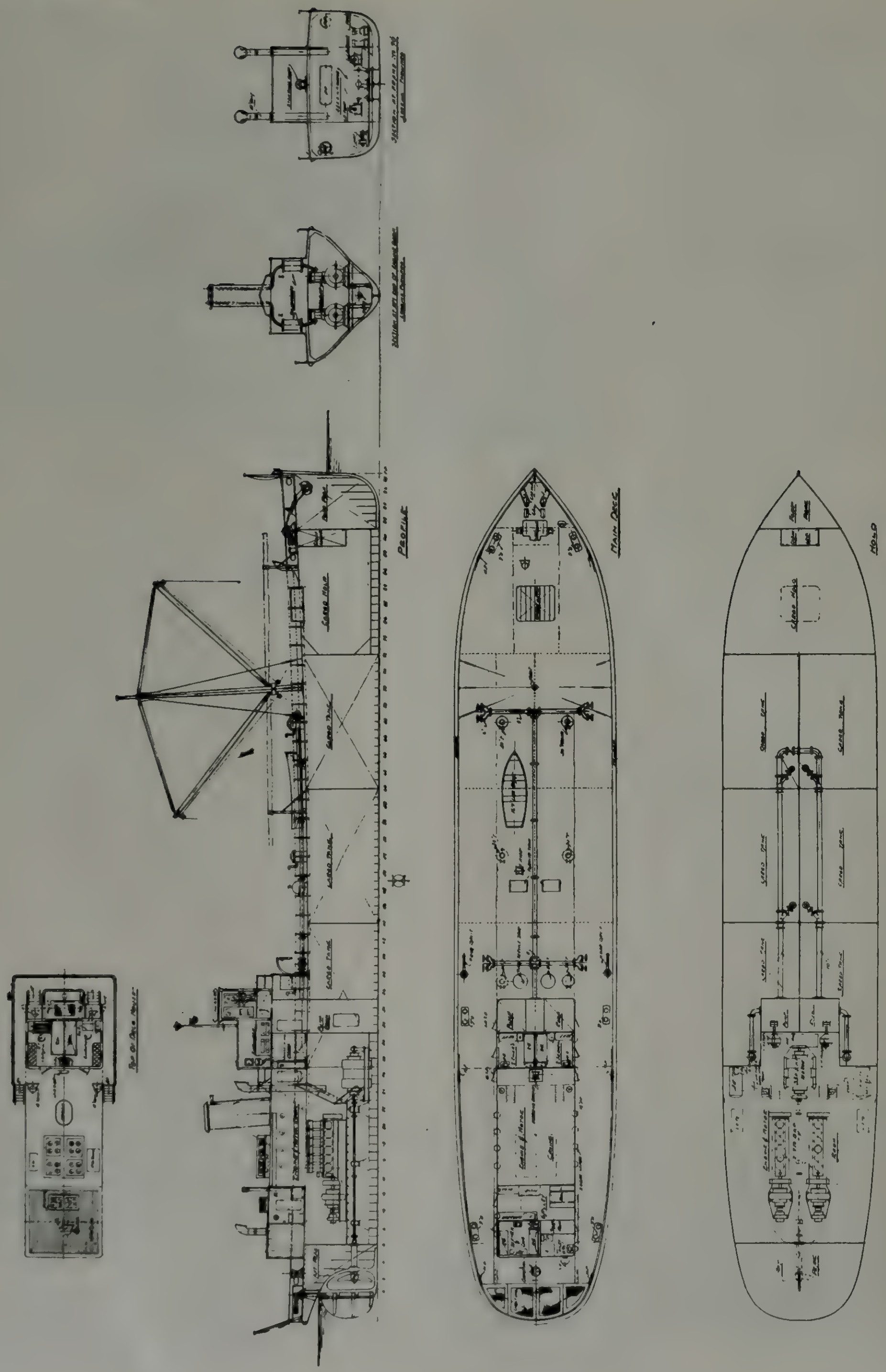
These engines in every mechanical detail are built to Union Gas Engine standard for tolerance in fit and for excellence of finish. That means that they are equal to any engines in these particulars and that they will stand up to the rugged usage demand of such engines by the fisherman and workboat operators of the Pacific Coast. This fact has been demonstrated in more than one instance already in the short commercial history of the Union diesel.

Three years or more ago the United States Bureau of Fisheries installed a 65-horsepower Union diesel engine on the fish patrol boat Kittiwake. This engine has been functioning perfectly ever since without 5 cents spent for repairs. The Bureau of Fisheries was so well pleased with the record on the Kittiwake that they are repeating on Union diesel on a much larger job. The fish patrol boat Brantnow being completed at Kruse & Banks Shipbuilding Company, North Bend, Oregon, is being equipped with a 225-horsepower Union marine type directly reversible diesel.

The officials responsible for Union Gas Engine Company's successful progress are O. H. Fischer, president; Roy G. Thompson, in charge of marine sales; and T. H. Yeager, marine sales engineer.

We also congratulate the officials of the Associated Oil Company's transportation and marine departments on this latest addition to their fleet. George D. Zeh is manager of transportation; Oscar Lundin, assistant manager of transportation; Walter Cox, port engineer; D. L. Rigdon, asst. port engineer; F. R. Starrs, steward.

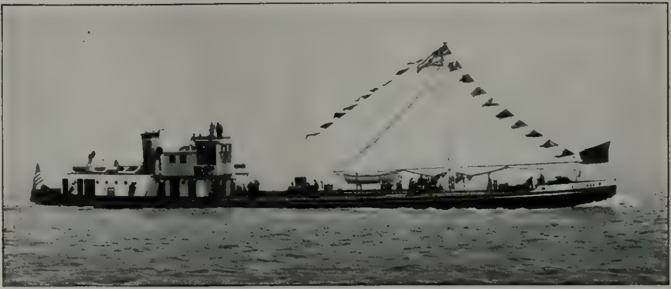
Above is a view of the ferryboat Ollie K. Wilds on the Mississippi, powered with two Union diesel engines. At right is the U.S. Bureau of Fisheries fish patrol boat Kittiwake, powered with a 65-horsepower Union diesel engine.



Inboard profile, plans, and sections of oil tank barge Richlube, just completed by Bethelehem Shipbuilding Corporation, Ltd., San Francisco, for the Richfield Oil Company.

Diesel-Electric Tanker Richlube

ANOTHER Bethlehem type shallow draft diesel-electric tanker has been added to the San Francisco Bay tanker fleet with the delivery of the Richlube. This vessel was designed and built at the Potrero Works of the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd. for the Richfield Oil Company. The work was done under the supervision of William D. Chisholm, manager of the marine department of the Richfield Oil Company.



Richfield Oil Company's diesel-electric bav tanker Richlube.

The general characteristics of the Richlube are:

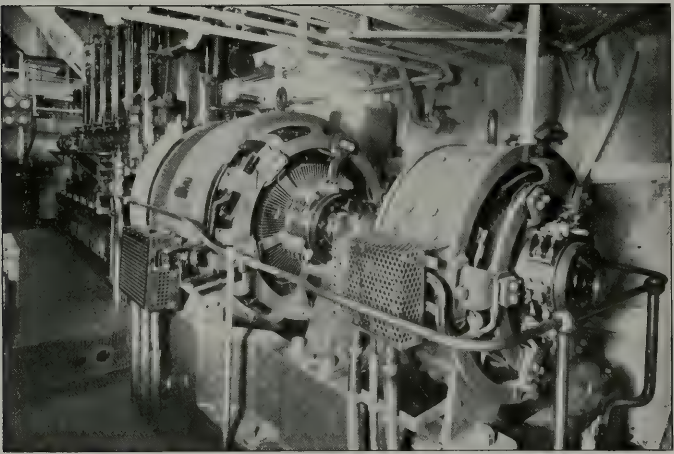
Length	180′6″
Beam	32′0″
Depth	14′0″
Oil cargo capacity, bbls.	7000

The hull is divided by thwartship and central longitudinal bulkheads into fore peak tank, chain lockers, cargo hold for package freight, six cargo tanks (arranged in three pairs), pump room, motor room, and after peak tank. In the house on deck are crew's living quarters, galley, and mess.

The Richlube power plant consists of two 145-kilowatt Westinghouse direct-current generators, each having a 20-kilowatt Westinghouse exciter mounted on the same shaft and each directly connected to and driven by a 250 horsepower, 6-cylinder, direct-injection, 4-cycle, non-reversible Atlas-Imperial full diesel engine operating full power at 275 revolutions per minute. These units are electrically connected through the Westinghouse marine type of Ward-Leonard control to a Westinghouse direct-current, double-armature marine propulsion motor, which delivers 350 effective horsepower to the propeller shaft at 160 revolutions a minute. Complete control stand for this machinery is installed both in the engine room and in the pilot house.

On the trial trip, Marine Superintendent Wm. D. Chisholm threw the pilot house lever over from full speed ahead to full speed astern, and there was no perceptible lag in the movement of the direction indicator.

This practically instantaneous reversal of driving motor is a feature of the electric drive that especially commends it to harbor craft and all vessels navigating in crowded or restricted water ways. On the Richlube's trials the vessel's progress was stopped and she was moving astern in less than one minute from full speed ahead. The speed on the measured mile was 9.5 knots. The propeller is a bronze 3-bladed wheel, 7 feet in diameter and with 6 feet 9 inches pitch.



One of the Atlas-Imperial-Westinghouse diesel-electric generating sets furnishing power to the Richlube.

Fuel for the engines is carried in two daily service tanks, each of 300 gallons capacity. An auxiliary air compressor, driven by gasoline engine, provides starting air. A Westinghouse auxiliary lighting set provides lights when main plant is idle. Two Northern rotary pumps are installed in the pump room and are driven by 75-horsepower Westinghouse motors in the engine room. The shafts connecting motors and pumps are carried through the bulkheads in special vapor-tight glands. These motors are fitted with the new Westinghouse seal sleeve bearings which are air and oil-tight and not only keep all lubricating oil out of electrical windings on the motors but economize greatly on the use of lubricants.

A feature of the pilot house control on the Richlube is the use of radium dials on the instrument panel, which greatly facilitates readings at night and is more practical than a bright illumination of dials in that it does not interfere with visibility for navigation.

Steering gear, capstan, and windlass are all of the well known Allan Cunningham type, designed especially for electric drive, and on the Richlube driven by Westinghouse motors. These auxiliaries functioned 100 per cent on the trial trip and called forth expressions of satisfaction from the officials of the Richfield Oil Company.

Marine Fuel Conservation, II

A Summary of the Manual Issued by the Fuel Conservation Section of the Emergency Fleet Corporation

> This series of articles is a transcript of the instructions given to Shipping Board inspectors to guide them in alloting ratings to vessels operated under the United States Shipping Board Emergency Fleet Corporation and in determining standing of engineering personnel on those vessels. The thought behind the publication of this material is that engineers may study at their leisure the suggestions contained therein and use those suggestions for the betterment of engine room efficiency and vessel economy.
>
> EDITOR.

Standards of Performance: Excessive fuel consumption, whether at sea or in port, is a mark of poor operation or condition of machinery, and frequently both. When this is the result of the type of operation, it of course reflects upon the efficiency of the engineers. To assist in determining whether fuel consumption was excessive or not, standards of performance, both at sea and in port, have been developed by the Fuel Conservation Section for all classes of Shipping Board vessels. The sea standards give the miles per ton of fuel consumed which a vessel should cover at various speeds and drafts, under average weather, bottom and current conditions. The port standard gives the amount of fuel which a vessel should consume in port, under average operating conditions, extra allowances being made for handling cargo and fueling.

Conditions which will affect ratio of actual to standard performance: Both sea and port standards are for average conditions, and if average conditions were encountered on a voyage the vessel should meet and equal them. If other than average conditions existed on the voyage, allowance must be made for them in rating the engineers for efficiency. A vessel encountering heavy North Atlantic winter weather, for example, is not expected to equal the standards. On the other hand, a vessel operating in fine weather, with fair currents, is expected to exceed them. It is not sufficient or entirely fair to base the engineers' efficiency marks solely on the average port and sea efficiency percentages for the voyage. In rating the engineers for efficiency, therefore, the efficiency percentages for the voyage should be used more as a guide than as a final criterion of the engineering performance.

Revision of standards: In setting the standards for the different classes of vessels, it was endeavored to make them just as practicable for one class to meet as another. Experience has shown that some classes of ships meet the standards more consistently than others, presumably due to the standards being somewhat low for this class rather than to a superior type of engineering. In the case of other classes of ships, it is found more difficult for them to meet the standard. Several of the standards have already been revised to overcome this characteristic and others will be revised as found necessary.

Comparison performances—sister ships: In studying a vessel's performance, compare it also with performances of the best ships of her class, as shown on the tabulated data sheets issued by this office from time to time, using same trade route if possible.

Study of operating data to determine efficiency rate: If the efficiency percentages are low, study the body of the report. How may they be accounted for? Is the low efficiency due to adverse weather or currents, resulting in excessive slip and low observed speed, or other circumstances beyond the responsibility and control of the engineers? Or, is it due to excessive fuel consumption for the horsepower developed? Consult the pounds fuel per horsepower per hour. Compare this with the fuel curve for this engine, at the power or per cent of full load being developed. If the fuel consumption is excessive, it is evident that either the boilers or machinery, or both, are not being operated efficiently.

Relations of physical condition to efficiency of personnel: Analysis of the physical condition report will also be useful in determining the efficiency rate, especially in reference to the line of action taken by the operating personnel to correct defects or the preventive measures taken to safeguard the equipment in case of a breakdown as, for example, in the case of a leaky condenser. A leaky condenser, when not immediately taken care of, salts up the entire system. The necessity of freshening boilers results in excessive fresh water consumption, making it necessary to run the evaporator, which is a very heavy steam eater. A comparatively slight amount of chlorine in water-tube boilers is dangerous. Salt carried over in the steam lines is always detrimental; it attacks the gaskets and in time causes numerous steam leaks which, in turn, increase the fresh water and fuel consumption.

Stops at sea, due to defects of the machinery, may or may not be an indication of poor operation. At times they may be not only necessary but commendable, and may occur on the most efficient ships. It is good engineering practice to stop to plug a leaky condenser, install spare piston rings, key up on pins or bearings, or remedy other defects as they arise during passage, and in such cases credit should be given to the operating personnel for having used good judgment. On the other hand, if stops are caused by failure of the operating personnel to have taken good care before sailing that the equipment be in good, safe operating condition, then the stop is chargeable against their efficiency.

Inaccurate records—discrepancy between the amount of fuel carried on chief engineers' log books and abstracts and the actual amount aboard, as shown by soundings. This is a serious matter. If the chief engineer does not know himself the correct amount of fuel on hand, he may at any time run out of it at sea. If, on the other hand, he deliberately is carrying a certain amount "up his sleeve," it becomes impossible to tell what the actual consumption was on the voyage and no proper estimate of the engineering efficiency can be made. An efficient engineer keeps a correct fuel account and a neat and accurate set of log books and abstracts.

Accepting a tow: This is always ignominious for an engineer, and unless there be extenuating circumstances, such as a lost propeller, it is ordinarily sufficient cause for a "C" or "D" rating, especially in the

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case of a vessel equipped with a reciprocating engine, Scotch boilers, and a machine shop, where it is in nearly all cases unpardonable to fail to patch up the machinery sufficiently to reach the nearest port unaided and escape the extraordinary expenses of towing and salvage.

Large turn-over of operating personnel: The records of this section show that a large turn-over of the officers and crew generally results in excessive repair bills and poor engine performance. With few exceptions the best performers are vessels which have a permanent and interested crew. In the early days of the Emergency Fleet Corporation the extraordinary turn-over of personnel was doubtless the principal cause of the excessive operating costs, greater even than the general inexperience which at that time prevailed. Conditions have been stabilized to a marked degree, especially within the last two years, and it is not infrequent to board a ship which has carried the same officers and various members of the crew for a number of voyages, in which case a good report is usually a foregone conclusion. A large turn-over generally reflects a deficiency in te proper type of discipline and the efficiency of the officers as organizers of their working forces. However, it may be due to other causes, such as unsatisfactory quarters or poor food, which should not be charged against the engineer officers.

Improvement in physical condition and performance: It is not expected that an engineer can take over a ship in a badly run-down condition and obtain an excellent performance on his first voyage, especially if he joined the ship just before sailing. A marked improvement over previous performances is sometimes just as much a mark of efficient operation as an excellent performance, and is just as meritorious.

Allowance for different types of equipment made in setting standards: Inherent differences in efficiency of various types of propelling machinery and equipment were allowed for in setting the standards for the various classes of ships.

Numerical value of ratings: The A, -A, +B, B, etc., ratings have been adopted in lieu of a numerical value inasmuch as it is practically impossible to give a fair and just numerical rating which would take care of the numerous extenuating circumstances which may affect the sea and port rating determined by the ratio of the actual to the standard performance. If there be no extenuating circumstances that affect the performance, then the rating of efficiency and operation would be the same as that determined by the numerical value of the sea and port performance on the following basis:

Total sea consumption between ports x sea performance rate = X

Total port consumption x port performance rate .... = Y

The sum of X+Y, divided by the total consumption for sea and port (not including pilot water consumptions) equals combined rate.

Example

8000 bbls. (total sea cons.)
x 90 (sea performance rate) .... =720,000
2000 bbls. (total port cons.)
x 70 (port performance rate) .... =140,000
10,000 860,000

$$\frac{860,000}{10,000} = 86\%$$ combined rate.

In which case:

A=Excellent = 95 to 100+
--A=Very Good = 90 to 95
+B=Good = 85 to 90
B=Fair = 80 to 85
--B=Probation = 70 to 80
C=Poor = 60 to 70
D=Very Poor = 60 minus

Modified Ratings: After due consideration of all matters incident to the voyage, if, in the opinion of the inspector, the engine performances were excellent, the engineers should be allowed an "A" rating. If not so good, other ratings should be allowed, according to the scale of ratings appearing on the voyage report. If, under adverse weather or current or other conditions, the voyage effi- loading which produces a trim down iency percentages are relatively low, but the engine performance nevertheless was excellent and "A" ratings are allowed the engineers, note should be made under "Remarks," explaining the modified rating allowed. If, under very favorable conditions, the vessel exceeds the standard but the engine performance was poor and did not merit the "A" rating, note should be made under "Remarks" explaining the reduced rating given.

Ship's Ratings

Engine department crew are rated according to report of chief engineer and the appearance of the department. Dirty and neglected conditions indicate an indolent and unreliable crew. The chief should be questioned as to any logging, desertions, insubordination, etc., during the voyage.

Equipment: This relates to the entire vessel. It is the average of all items listed separately under "Present Physical Condition." To merit an "A" rating, all equipment must be in excellent condition. Under "Remarks" should be a brief notation of items wich may lower the equipment rating. For example, in case a condenser requires retubing and furnace brickwork requires renewal, the equipment will of course be rated less than "A" and to explain the lower rate under "Remarks" note: (Condenser, Boilers) and lead an arrow from the rating to the notation.

Operation includes not only engine performance but also efficiency of navigation and efficiency of handling and superintendence of vessel by operators and agents. The rating given for operation must necessarily be tied up with the rating determined by comparison of the actual to the standard fuel performance at sea and in port and also by all of the items which require consideration in determining the efficiency rate of engineer officers. In addition to these items, however, consideration must be given to several additional items, such as:

Navigation: Some features of poor navigation are: Failure to follow the prescribed course, bad steering, failure to take advantage of favorable currents or steer clear of adverse currents wherever practicable, driving ship into heavy weather, with resulting high fuel consumption and bottom damage, failure to time arrivals properly, such as making high speed and arriving off a port at night to await daylight, making high speeds when not required by schedule, excessive standby before sailing. These conditions may be checked by analysis of daily logs.

Loading and ballasting: Improper loading of vessel reflects against operation of the vessel: that is, loading which produces a trim down by the head or excessive drag, also failure to properly utilize ballast tanks so as to give vessel correct trim and wheel submergence—is chargeable against operation.

Expediting turn-around of vessel: Some features of poor handling and superintendence of vessel by operators and agents are: Failure to expedite the vessel's movements.

(To be Continued)

Pacific Workboats and Their Power Plants

Workboating in the Delta

THE peculiar formation of the islands of the Delta District of the San Joaquin and Sacramento Rivers, with the many winding channels, makes the workboat almost indispensable. Hundreds of families would be practically isolated but for the daily call of the workboat. Business there would be almost impossible and vast areas or arable land, now fat with growing crops, would be given over to weeds and tule. Less than twenty-five years ago these areas were the haunt of wild fowl. Today food for thousands is produced and marketed, the principal factor in this result being the homely little workboat and the bigger and less handsome brother, the barge.

Among the first to see the need for the development of this workboat business were the Colberg Brothers of Stockton. Starting in a small way, this firm has built up a large business and now has a fleet of ten boats running regularly from Stockton, touching at all points within a distance of sixty miles. Five of these boats are operated daily, carrying freight and passengers. Two others make more extended trips, going as far south as Terminous. To show the volume of business done, last year over one hundred and seventy thousand passengers were carried on the different routes, in addition to thousands of tons of parcel freight and mails.

New concrete ways at Colberg Brothers' boatyard, Stockton, California.

The maintenance and replacements to this fleet require a well equipped yard, and this is situated a short distance below Stockton with a waterfrontage of 500 feet. A woodworking mill, machine and blacksmith shops, and marine ways keep an average of thirty men employed constantly. The volume of business yearly runs vell over a hundred thousand dollars, exclusively expended in workboat building and repairing, of which the firm makes a specialty.

Besides their own fleet, Colberg Brothers build and repair for other firms. Contracts are in hand now for two vessels, one for Elmer Gormser, 65 by 22 feet, with a direct reversible Fairbanks-Morse full diesel engine of 120 horsepower. The other is a ferryboat for San Joaquin County, also to be powered with a Fairbanks-Morse unit. Hull work at this yard is under the management of William G. Colberg, while his brother, Henry J., looks after the mechanical engineering. Walter Eaton handles the office work, while L. E. Moore is manager of the Colberg Launch and Towing Company, which, while owned by the Colberg Brothers, is operated as a distinct company.

A Pacific Marine Review representative was a guest of the launch company recently and enjoyed an interesting launch trip through the delta. Great possibilities for future growth were apparent, as vast stretches of tule land are still available for cultivation. This soil is very fertile and, through economical workboat transportation, crops can be cheaply put on the market. Potatoes, asparagus, onions, barley, corn, and many other varieties of vegetables form the major crops. The highways, or rather waterways of intercommunication, are sheltered and deep. Landings can be made almost anywhere along the banks, the rise and fall of tides being slight; so that passengers and freight are easily handled. One man usually makes a crew for a workboat on San Francisco Bay; but on the delta run two are employed owing to the volume of traffic. With diesel engines, profits are good and the business will no doubt grow rapidly with the steadily increasing acreage under cultivation. This means, more business, more workboats, and greater growth for California.

Various types of river boats on the ways at Colberg Brothers' boatyard, Stockton, California.

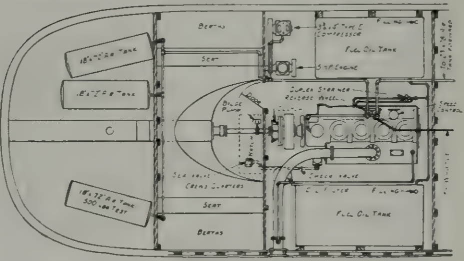
Another Busy Yard

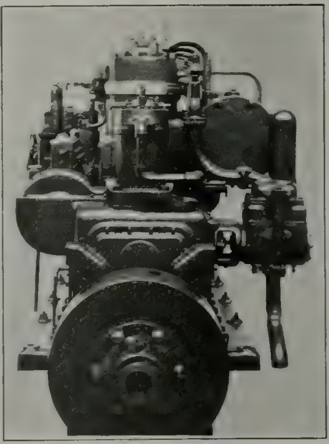
STEPHENS BROTHERS' Boatyard at Stockton, California, turns out many of the small craft plying from that port. The firm is composed of two brothers, Robert R. and Theodore J., both young men, but with boat building ability of the best kind. They do a big share of the work along this line in the district and besides build many swift cruisers and speed boats for Lake Tahoe and other places.

During a recent visit to the yard, a Pacific Marine Review representative noted twelve craft in various stages of construction in the building sheds. An average force of twenty-six men is constantly at work, with an output value around $100,000 per year.

Conversion of Halibut Schooner

Above is shown a view of the halibut schooner Prospector, recently converted to diesel drive; at right, layout of machinery space; and below, an end view of the Fairbanks-Morse diesel engine.





AN illustration of how simple it is to adapt an old boat for the diesel engine is shown in the case of the halibut schooner Prospector of the Newfoundland type which was recently reconstructed by the King & Winge Shipbuilding Company at Seattle and equipped with a 120 horsepower Fairbanks-Morse diesel. The Prospector was purchased from Seattle interests by the Lyons-Olson Fishing Company of Los Angeles, who sent her to the Seattle yard to be rebuilt.

While the engine room layout of the Prospector is of a standard type for a fishing vessel, the arrangement of the exhaust is somewhat unusual inasmuch as the exhaust line is carried overboard through the starboard side of the vessel. This exhaust is carried through a copper gooseneck to a special bronze hull casting which is fitted with a pad approximately 10 inches from the outside through which the circulating water from the engine is discharged.

The engine is one of the new Fairbanks-Morse diesels of the 2-cycle airless injection type, a prime mover of unusual compactness and simplicity. Complete control of the engine is taken care of by means of two handwheels, the larger of which handles the starting and reversing, and the smaller handles the speed control.

This engine is entirely free of complicated valves due to the use of the 2-cycle principle. Since airless injection of the fuel is used there is no necessity for using a high pressure air compressor, and the compressor which is used for supplying the air for maneuvering is built in as a part of the engine.

The auxiliary equipment of the installation consists of a five horsepower, 4-cycle DuBrie engine and a type "E" 3¾ by 4-inch Fairbanks-Morse air compressor located on the port side directly aft of the port fuel tank. A locally made plunger type bilge pump is actuated by an eccentric bolted on to the propeller shaft directly aft of the one-way clutch, which is attached to the fly wheel.

In this particular installation the location of the fuel tanks was sufficiently high to eliminate the use of a gravity or day tank, and a duplex type strainer is installed in the fuel header. A drain is provided at the low point of each fuel tank, which permits draining off any accumulation of water.

The air supply consists of three 18 by 72-inch tanks located in the stern, and one 33 by 78-inch tank located in the fore peak. This air supply proved ample even for the excessive maneuvering of the trial trip.

The Prospector is 92 feet long with a beam of 20 feet and a depth of 11 feet; the net tonnage is 50. A Coolidge three-blade, 54-inch diameter, 32.5 pitch propeller is used. The propeller shaft is of bronze and is 4 inches in diameter with a shaft bushing which is 4¾ inches in diameter. On the trial trip at 358 revolutions per minute of the engine the vessel made 9.3 knots or 10.5 miles per hour.

This vessel will be used as a fish carrier between the fishing grounds off the coast of Mexico and San Pedro and Santiago. It is the plan of the company to buy the catch from the fishermen and to transport it to the markets with this vessel.

Although this boat had a very limited trial trip it put out for San Pedro on March 30 and made the trip in five days despite heavy weather. For two days she had to battle with an 80 mile gale. Considering weather conditions the voyage of the Prospector is one of the most remarkable made by a small vessel on the open ocean in years and shows conclusively the dependableness of the modern diesel engine. When Captain Olson arrived at San Pedro he reported that he was very much impressed with the performance of the diesel engine and the maneuvering qualities of the vessel.

Freighting on the Rivers

Captain Ben Walters, president of the Island Transportation Company, Stockton, California.

ANY story of Stockton, California, and its inland fleets of workboats and barges would be incomplete unless Captain Ben Walters was mentioned. This gentleman handles a big fleet of craft engaged in the towing and freight barge business.

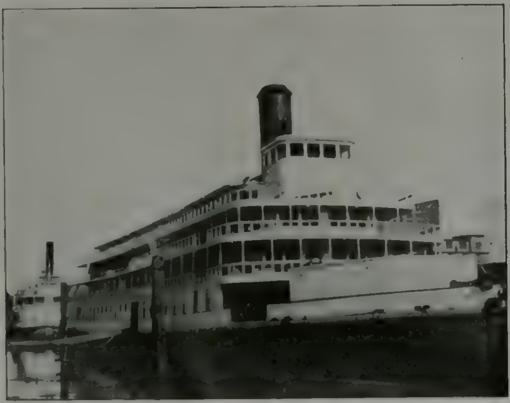
The Island Transportation Company, as his firm is known, has been managed for years by Captain Ben, as he is known to all marine folks around the bay and delta district. In fact Captain Walters started the business twenty-four years ago with one vessel, and there are now forty boats and barges in the fleet. He was born in Calaveras in 1867, and all of his life has been passed with maritime affairs. In his boyhood he went to sea on deep water vessels, rounding Cape Horn and facing heavy gales when most youngsters are in school. Youth, vigor and hard work soon put him ahead, and he now carries his years jauntily, commanding the respect and admiration of the men who work under his supervision.

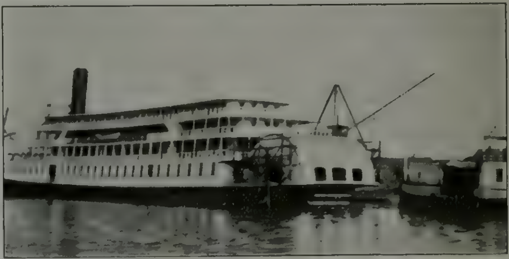
Captain Walters is very ardent in his support of a deep water channel to Stockton, and has done a great deal towards that project. He also takes an active part in civic matters. He has an ambition to buy a Gloscester fishing schooner and fit her up as a private yacht to renew his deep sea experiences.

The Captain told a Pacific Marine Review representative that he is contemplating changing the present power plants of his fleet into diesel drive, being convinced that the diesel has now reached a point where reliability and economy are assured. As the company has a splendidly equipped yard and machine shop, the alteration of the vessels could be done by them very handily. Although complete in detail, the company's yard does not cater to outside business, caring only for the needs of their own fleet.

Island Transportation Company barges unloading at a San Joaquin River wharf.

A Delta King and Delta Queen

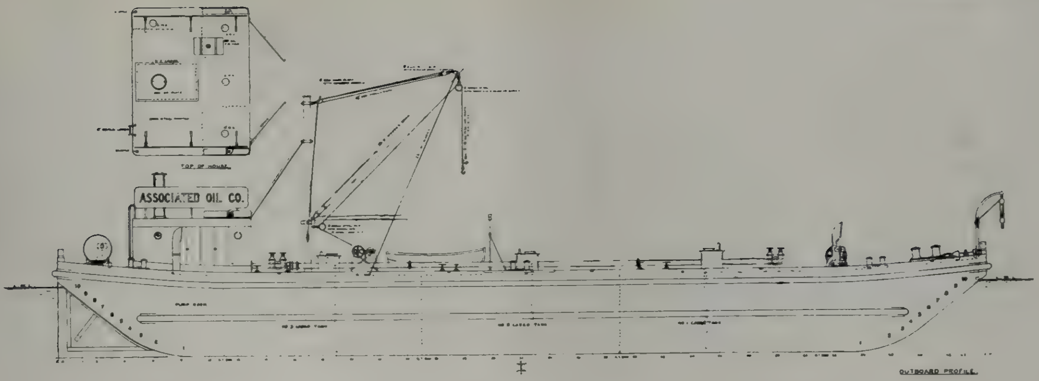


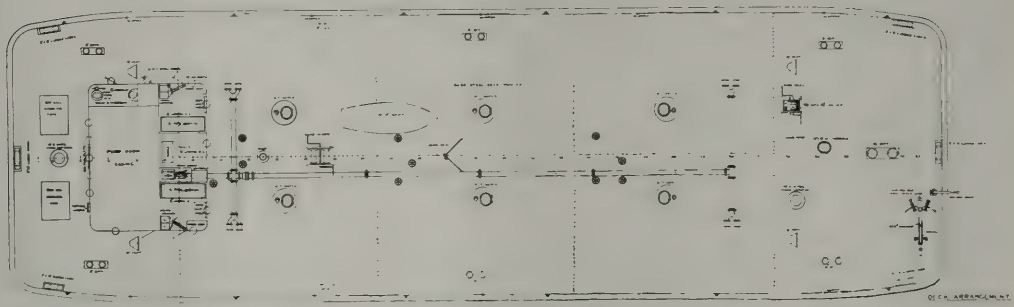


The California Transportation Company operates its own shipyard, which is the largest in Stockton, California. Here it builds and repairs the fleet of vessels plying the waters of the Sacramento and San Joaquin Rivers and San Francisco Bay.

The latest job is the construction of two large stern-wheel river steamers Delta King and Delta Queen, which will be ready for service about August 1, 1926. They are of galvanized steel with tonnage of 1837, and are equipped to carry passengers and freight. Accommodations for passengers are large, well ventilated, comfortable, and in every way first-class.

Pacific Marine Review will later publish a complete description of these steamers.





New Steel Oil Barge

Los Angeles Shipbuilding and Drydock Corporation Building Tow Barge for Associated Oil Company

THE Associated Oil Company of California recently awarded to the Los Angeles Shipbuilding & Drydock Corporation contract for the construction of a shallow draft steel towing barge for the transportation of bulk oil. The general characteristics of this hull are:

Length	131′0″
Beam, molded	40′0″
Depth, molded	11′6″
Draft, loaded	9′6″
Bulk oil capacity, bbls.	7000

The barge is of the single deck type with 6-inch crown to the deck and 21 inches shear forward and aft. It is to be built on the transverse framing system, 15-pound shell plating, double chain riveted throughout. The keel plate, shear strake, and knuckle plate are of 17½-pound material. The deck plating, with the exception of the stringer plate, which is 15-pound, will be of 12½-pound material throughout. Two longitudinal trusses of channel and angle bars are to be fitted one on the port and one on the starboard side 11 feet off the center line.

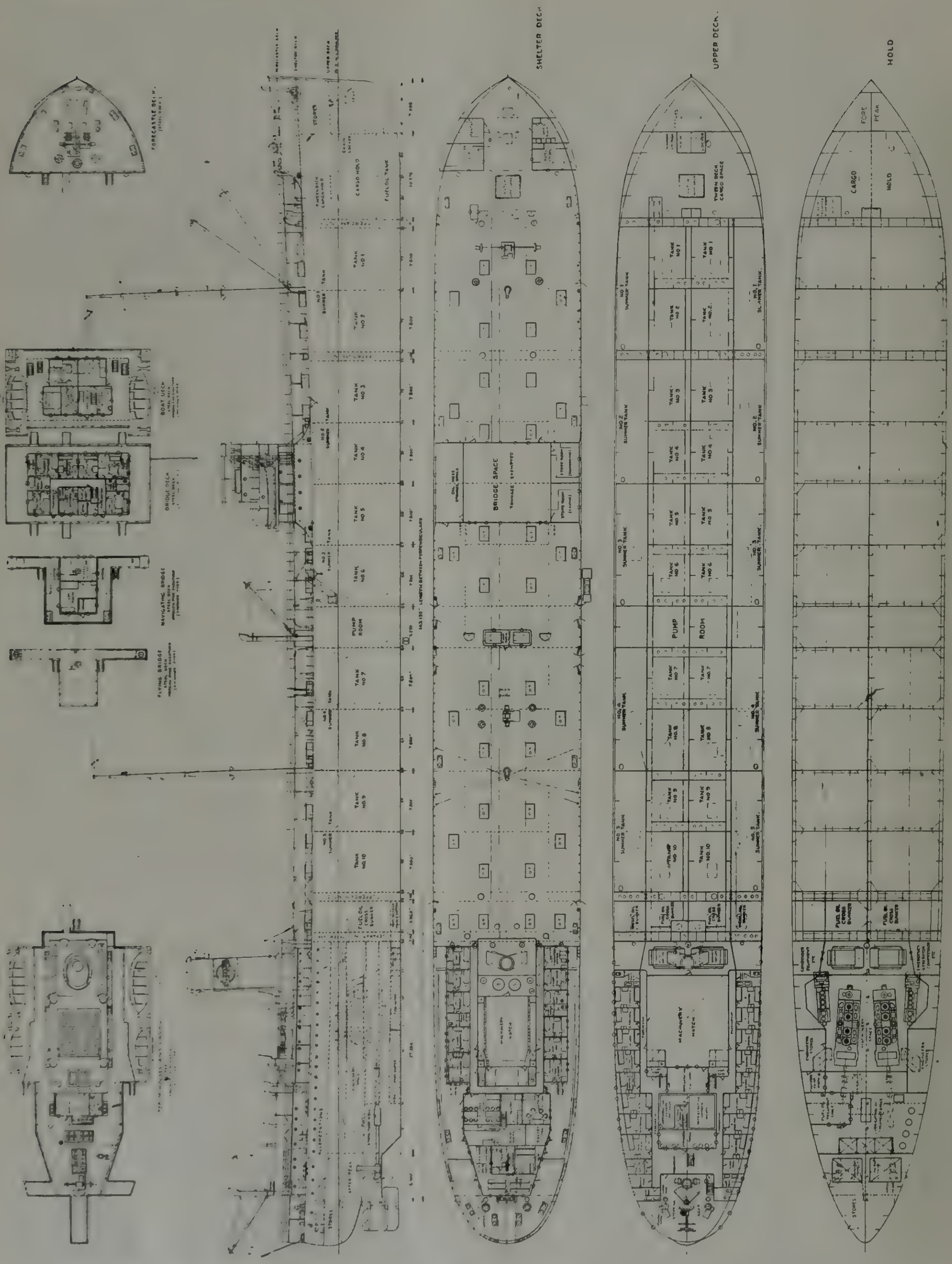
As will be noted from the outboard profile and plan published herewith, the barge has been carefully molded with the idea of reducing power required for towing without any sacrifice of bulk capacity.

The hull is divided by longitudinal transverse bulkheads into six oil tanks and a forehold and pump room. A cylindrical oil-tight expansion trunk is fitted over each oil tank and each trunk is equipped with plate cover suitably bolted and jointed in position.

The pumping equipment will consist of one 80-horsepower Western-Enterprise gasoline engine, directly connected through clutches and flexible couplings to two 10 by 7 by 8 Kinney rotary pumps each capable of delivering 700 barrels per hour at 100 pounds pressure when running at rated engine speed. Air starting device and starting air tanks will also be fitted in the pump room and a 4-inch I-beam with traveler will be installed for handling machinery. A 1½-kilowatt, 110-volt, gas engine driven generator will supply current for lighting-fixtures and for a service pump.

For the discharge of the cargo an 8-inch suction header is fitted on each side with 8-inch branches to each of the six main oil tanks. These lines will be cross-connected in way of No. 1 tank with valve between. The discharge piping will consist of 8-inch line from each pump, combined into a single 10-inch header fore and aft, with 8-inch branches to each tank.

A 4-inch relief valve set at 100-pounds pressure will be fitted to each pump for discharging back into suction line. Eight-inch equalizing valves will be fitted to center line bulkhead in way of each tank as close to the bottom as possible.



Inboard profile and plans of 12,000 deadweight tons' capacity motor tankers built by Fried. Krupp Germaniawerft at Kiel for the Standard Oil Company (N.J.)

New Motor Tankers for Standard Oil

IN 1923 the Standard Oil Company of New Jersey placed orders with the Fried. Krupp Germaniawerft at Kiel for five 12,000-ton motor tankers. The designs for these tankers were made in America by the Standard Oil staff, and the models for these designs were tested at the University of Michigan, Ann Arbor, tank. A complete description and drawings of these original designs were published in Pacific Marine Review for December 1923.

The motor tanker Persephone on her trials.

Three of these tankers were completed and put in operation late in 1925 and through the courtesy of the Standard Oil Company (N. J.) we publish this account of the ships and the pictures and drawings illustrating same.

The three tankers are named Persephone, Den Haag, and Motocarline. The general characteristics are:

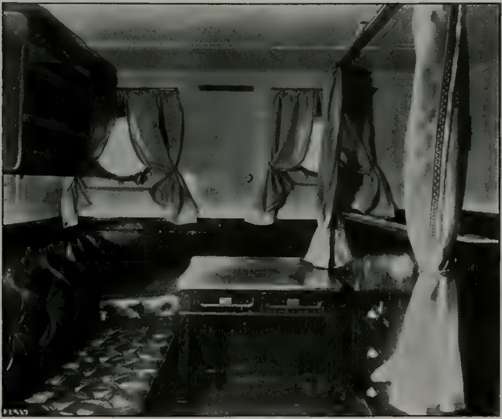
Lengh over-all	489′7″
Length between perpendiculars	469′7″
Beam, molded	63′0″
Depth, molded to shelter deck	35′6″
Depth, molded to upper deck	23′0″
Draft, designed	26′0″
Draft at summer free board	26′2½″

The hulls were constructed to meet the rules of Lloyd's Register for the Isherwood system of longitudinal framing for Class 100 A-1 shelter deck. It was specified also that these hulls comply with rules of the German classification societies, the British Board of Trade, the Hamburg Harbor Police, the American Steamboat Inspection Service, the Canadian Department of Marine, the Norwegian Inspection Board, and the Panama and Suez canal regulations.

The motor tanker Motocarline on her trials.

These vessels are all twin screw. Propelling machinery for the Persephone and for the Motocarline consists of two 4-cylinder, 2-cycle Germaniawerft marine diesel engines each delivering 1450 shaft horsepower at 90 revolutions a minute. The Den Haag has two 6-cylinder, 4-cycle marine diesels of the same make and delivering 1450 shaft horsepower each at 125 revolutions a minute.

These motors are all of the well known Krupp type, which has been improved by increasing the port area of the scavenging valve in the cylinder heads. This permits the use of lower pressure in scavenging air and the attached scaveng-



Solid Comfort

The room shown in the illustration at the left is not a first-class passenger cabin on a Danish motorship. This illustration depicts a room as fitted up for a petty officer on board the new Standard Oil tankers. Note the luxurious leather upholstery on the lounge, the large drawers under the berth, the depth and width of the berth.

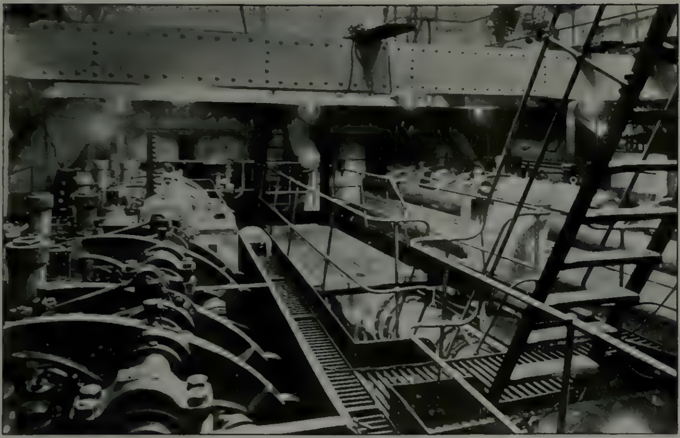
All of the furniture in these rooms is of pressed steel.

No room here for any sneaking cockroach or other bug to find a hiding place.

Every room on these ships is supplied with ample ventilation, and arrangements are made to have the entering air either cooled or warmed according to the necessities of the climate at any location on any voyage.

All the rooms are unusually large, and each officer has his own room.

The standards of comfort afloat are certainly rising.



The upper platform in the motor room of the motor tanker Persephone showing valve gear at the top of cylinders.

ing pumps are operated by a bracket arm rigidly attached to the crosshead. This arm also carries the trombone slide pipes for piston cooling water. An electrically driven scavenging pump is provided for maintaining scavenging air pressure while maneuvering. These engines are comparatively light, weighing about 306 pounds per shaft horsepower including all attached equipment, accessories, and spare parts.

All auxiliaries, except the cargo pumps and the emergency generating set, are electrically operated. The electric power plant is composed of two 100-kilowatt, 230-volt and one 60-kilowatt, 230-volt diesel driven generators, one 90-kilowatt gas engine driven generator, and one 17-kilowatt steam turbine driven generator. The steering gear is electro-hydraulic on the Hele-Shaw system.

Two Babcock & Wilcox water-tube boilers, fitted with Todd mechanical injection oil burners are installed in the forward end of the engine room, the uptakes leading to a stack enclosed in a large false stack and sharing this with the exhausts from the diesel engines. These boilers supply steam for the heating coils in the cargo tanks and for driving the cargo pumps.

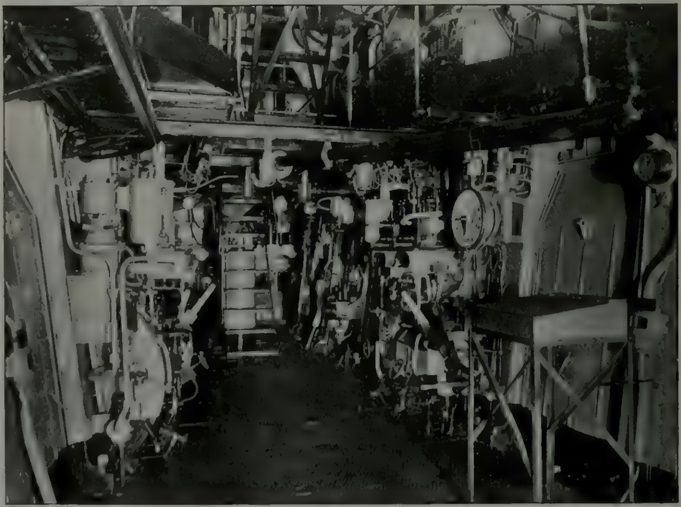
The cargo pumps are three in number, two main pumps and a stripper pump. They were all designed by the National Transit Pump and Machinery Company and built by the Atlas Works, Bremen, Germany. The main pumps are of the compound duplex type vertical with steam cylinders 14 inches and 20 inches in diameter, the pump cylinders 15 inches in diameter, and the stroke 24 inches. At thirty strokes a minute each pump has a capacity of 3000 barrels an hour, and they will empty one of these tankers in about 15 hours. The stripping pump capacity is 640 barrels an hour.

Elaborate heating coil systems extend to every cargo tank on these vessels. Pneumercator gauges show tank levels in every tank. The piping system is arranged so that the tanks are pumped in specified groups, and an unusual number of outlets are provided for discharge lines. All main discharge lines are 12 inches in diameter and all main suction lines 15 inches in diameter.

Complete fire protection on the Lux carbon-dioxide system is carried to all parts of the vessels. The battery of 126 flasks, interconnected by a well designed system of manifolds and piped to all enclosed spaces, is located on the shelter deck under the bridge superstructure.

Quarters for officers and crew on these tankers are designed and equipped for luxurious comfort. All furniture and fittings are in metal. Warm and cold air ventilation is installed. Rooms are all large with ample light and are equipped with the very best in upholstery, bedding, floor covering, and drapes. The galleys and messrooms are larger and more completely outfitted than is usually the case on this class of vessel.

On her trials the Persephone loaded to a displacement of 17,750 tons, ran 11.9 knots an hour at 92.1 revolutions a minute of the engines, and with a total shaft horsepower of 3078. At 72.5 revolutions, corresponding to 1620 total shaft horsepower, she made 9.47 knots an hour.



Working platform in motor room of motor tanker Persephone showing engineer's desk, motor telegraph, and motor controls.

Auxiliaries—Ship Supplies—Marine Equipment

Beautiful Decking Afloat Artistic Flooring Ashore

A well designed floor of U.S. Rubber Tiling in the lobby of the Matson Building, San Francisco.

ONE of the major problems of the marine interior decorator is to harmonize floor covering with decorative motif. Where carpets and textile rugs are adaptable to the conditions there is, of course, an almost infinite variety from which to choose. However, carpets and rugs at sea are expensive in first cost, in maintenance, and in sanitation. Moreover, in the construction of modern passenger vessels there is an increasing tendency to get away from all wood deck sheathing, and the steel deck covered with any of the bitumen or cement compositions presents great difficulties in the application of textiles.

To meet this problem, the United States Rubber Company has developed the art and technique of rubber tile floor coverings to such a dedegree of perfection that sizes, colorings, and grainings of U. S. rubber tile are available and cover practically every architectural and artistic need of the interior decorator either afloat or ashore.

The first U. S. rubber tile was laid in 1897. Since that time rapid progress has been made in the scientific development of this material. Today it is recognized by architects as one of the most beautiful and practical forms of flooring available in any material.

The durability of rubber from the standpoint of wear is demonstrated daily in the automobile tire and in various patches of pavement which have been laid for demonstration purposes. U. S. tile is compounded from the finest virgin rubber under modern processes which insure long life. These processes are so arranged and developed by the United States Rubber Company as to give a very broad range of coloring and marble veined effects. These colors and veinings are an integral part of the material and no amount of wear can deface the design or deaden the color. Patterns are all standard so that any occasional replacement which may become necessary is easily effected.

One of the most important factors in the complete satisfaction given by rubber flooring is resiliency. This insures comfort, quiet, and unsurpassed wearing quality. U. S. rubber tile floors, as has been demonstrated in many an American hospital, are not easily marked by stain or burn, are very easily cleaned, and in every way aid in the keeping of sanitary conditions.

These tiles are available in standard stock sizes from 6x6 inches up to 20x20 inches, and in 3/16, 1/4, and 3/8 inch thickness of material. Well designed core base and wainscoting of the same material and designs can be obtained if desired. This material is available in strip form up to 40 inches wide and in various lengths.

A well selected flooring of U. S. rubber tile for the public rooms of a passenger liner gives added beauty to the decorative motif of those rooms, is economical in maintenance, comfortable and quiet underfoot, easily kept in a clean and sanitary condition, and in every way a profitable, permanent flooring investment.

Smoking room on the Matson Navigation Company's steamship Maui, a good example of the decorative treatment in U.S. Rubber Tile.

Enticing Travelogues

Canadian Pacific Cruises. We have received two books from the Canadian Pacific which are certain to make the most confirmed landlubber and stay-at-home long to throw home and business care to the wind and voyage around the world. One of these books covers the 1926-1927 Round-the-World cruise of the Empress of Scotland; the other covers the 1927 Mediterranean cruise of the Empress of France.

Both books are beautifully made up, printed on fine coated stock, and contain pictures and complete itinerary.

Trans-Bay Freight Handling

Lift Platform System Proves Economical in Two and One-Half Years' Trial

SOME years ago when it became apparent that the old and expensive method of handling discharge and loading of general cargo by hand truck was no longer satisfactory, Al T. Gibson, president, and J. J. Lankin, general manager of the Bay Cities Transportation Company, began to investigate mechanical handling methods. They quickly became interested in the system then and now used by the Matson Navigation Company, the Oceanic Steamship Company, and the Pacific Mail Steamship Company.

This consisted of a number of Elwell-Parker electric lift platform trucks and was then proving itself to these companies as highly efficient, so that its use was extended from time to time as business increased. The Bay Cities Transportation Company officials recognized the value of this system and added to it the use of a large number of wooden platforms capable of supporting truck loads of all the various kinds and sizes of articles which go to make up the general cargo arriving at the ports on San Francisco Bay.

San Francisco Bay has a mean tidal range of about six feet. This fact made necessary some method of compensating for the difference in level so that in handling freight to or from ship, lighter, barge, or pier the truck equipment could be used with full efficiency at all times and at all stages in the tide. This problem was met by equipping several barges with Barlow marine elevators. These elevators, which are fully described in article on page 269 of this issue of Pacific Marine Review, easily take care of all differences in tide level met on the Pacific Coast and greatly expedite the safe and rapid discharge or loading of cargo.

The Bay Cities Transportation Company is at the present time the only barge company on the Pacific Coast using this modern mechanical system of handling freight. This system enables them to reduce to a minimum loss by pilferage and breakage and greatly speeds up all freight movements. It has been developed to the point where barge service formerly slow and uncertain has now become an express freight service without increasing the cost to the customer.

Scene in the warehouse on the Oakland pier of the Bay Cities Transportation Company. Details of Barlow elevators on opposite page.

Naturally such improvement in service without additional cost has resulted in growth of business, and the Bay Cities Transportation Company has consistently anticipated this increased demand by the installation of new and improved floating and dock equipment. They now have in use eight Elwell-Parker special large lift trucks and approximately a thousand wooden platforms $4\frac{1}{2}$ feet wide by $5\frac{1}{2}$ feet long. In the floating equipment they operate several covered barges equipped with Barlow marine elevators.

The use of the lift platform system of handling freight brings about a large degree of cooperation between the shipper and the various factors entering into transportation. Best results from this system are, of course, obtained when freight is placed upon the platform at point of origin and handled on the platform straight through to point of destination.

One of the essential requirements in lighterage service handling general cargo consignments is flexibility. Electric trucks seem especially designed to perfectly meet this requirement. Their short turning radius and flexibility of speed control enable them to maneuver their loads into the corners of freight cars or through narrow passages in congested warehouses or docks, with great speed and facility.

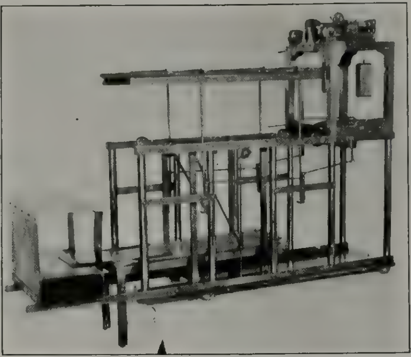
The electric truck is dependent on its storage battery for power. These Elwell-Parker trucks are equipped with Edison batteries. This battery has always been regarded by the wizard of electricity as one of his greatest inventions. Its chief characteristic is long life under extremely hard conditions and ease of recharging even when completely run down. The late Charles Steinmetz says of this battery:

"The characteristic feature of the Edison battery, which appears to me as the main advantage, is the complete reversibility of the chemical reactions which occur in it. With the materials — iron, nickel, and their oxides in caustic potash as electrolyte no chemical process can occur which is not electrolytically reversible. From that, then, would follow that there could theoretically be no deterioration of the battery; that is, no decrease of capacity from use or abuse. It cannot be seen how an irreversible process could occur in the Edison battery. The battery does not age, has no definite life, but its life is limited, theoretically, only by mechanical destruction."

Trans-bay freight handling between San Francisco and the East-bay cities and between all the bay cities and the various industrial establishments on upper San Francisco Bay and the rivers flowing thereinto has been growing very

(Continued on Page 269)

Combined Elevator and Gang Plank



Captain Henry Barlow's demonstration model of his combined elevator and gang plank. This model, made of brass, is worked by an electric motor and storage battery. At a touch on the various levers it obeyed every wish of the operator. Used as a gang plank, the platform apparently floats into the correct position with an almost incredible smoothness of motion. This elevator is a combination of good mechanical engineering with the art of the expert rigger.

UNDOUBTEDLY handling of materials on and off vessels and to and from piers constitutes one of the very large charges making up the total of transportation costs. Much engineering work has been done for the purpose of reducing the costs of handling, and many very useful and economical mechanisms have been developed to take care of the various phases of loading and discharging general cargo.

Some years ago Captain Henry Barlow, a Seattle steamboat man, as the result of his observation and experience in the handling of heavy freight to and from vessels on Puget Sound, where tidal conditions are rather difficult, equipped one of his own ships with a mechanically operated elevator of rather unusual design. This elevator worked so well and created so much attention on the Seattle waterfront that Captain Barlow formed a company for the building of such elevators and installed a number on the wharves and on the vessels in and about Puget Sound. All of these elevators proved to be of great assistance in effecting economy in loading and discharging and easily demonstrated their ability to pay for their installation and maintenance and make a good profit.

The demand for elevators increasing, Captain Barlow found that he could not properly attend to his own business as a steamboat man and manufacture elevators for himself and for other steamboat operators, so arrangements were made with the Colby Steel and Engineering Company of Seattle to handle the manufacturing end of the elevator business, and a new and improved design of marine elevator with adjustable wharf gangway is the result.

These elevators have, in a large number of instances, demonstrated great savings as compared to either the over-all hoist method of discharging and loading cargo or the simple hand truck method. The average single over-all hoist will handle from 20 to 30 tons of general cargo per hour. The Barlow elevator, under normal working conditions, will handle in or out of the vessel from 100 to 125 tons of general cargo per hour.

The elevator is adaptable to any power installed on board of a vessel. It may be operated by means of an ordinary steam winch. Installed as an adjustable gangway and wharf elevator, power may be electrical, taken from the usual city current, or if this is not available, steam hose connection may be made from the steam plant on the vessel to a steam engine operating the elevator. It also adapts itself very nicely to gasoline or diesel engine drive.

The elevator platform is hung on four distinct cables in such manner that it is not affected or strained by rolling, pitching, or listing of the vessel, and no matter how the load is placed the platform will not bind or produce undue friction on the guides.

This device is particularly useful in ports having a large tidal range and in rivers where large variation in the water level is experienced. Some of the present users of the Barlow elevator in Puget Sound district are: Canadian Pacific Railway Company, the Harbor Island Dock & Warehouse Company, the Pacific Mills Limited, Ocean Falls, B. C., The Inland Navigation Company of Seattle, the Puget Sound and British Columbia Freighting Service, the Port of Seattle, Dodwell & Co., Ltd., and Galbraith & Co., Seattle.

Barlow combined elevator and gang plank installed at a Seattle wharf.

Freight Handling

(Continued from Page 268)

rapidly during the past few years and seems destined to an even larger growth in the future. The Bay Cities Transportation Company, with its improved facilities for handling this business, is getting a large share and will continue to get an increasing proportion.

Barlow elevator as installed on a Puget Sound steamer.

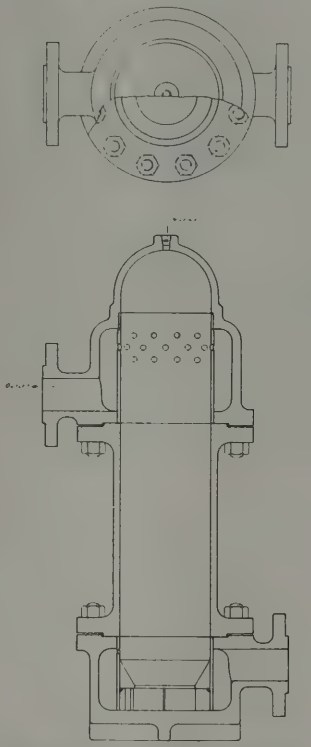
The Improved Hickman Air Separator

THE illustration herewith shows an inboard profile and a midship section of the improved vortex type Hickman air separator as built by the Western Engineering Company of San Francisco. In this device the feed water for a boiler or the circulating water for a condenser is led through a group of vanes arranged spirally on the inner periphery of a brass sleeve fitted into the cast steel inlet chamber that forms the bottom cover of the upright cylinder. These vanes impart a spiral whirl to the ascending water which greatly facilitates the separation of the entrained air.

Into the cast steel upper cover is fitted another bronze sleeve perforated for about the upper one-half of its length and surrounded by the water outlet chamber formed in the steel casting. The entrained air escapes to the bell or dome at the top of the upper cover and is vented to the atmosphere or to some convenient measuring device.

In a series of tests recently carried out of the engineering laboratories of the University of California, this new type of Hickman air separator proved itself highly efficient in freeing water from entrained air.

In making these tests two Hickman air separators were installed in series on the discharge side of a centrifugal pump. The water discharge from separator No. 2 was led into a weir tank and the air vent of each separator was piped to a graduated bottle inverted with its mouth under water so that the amounts of air vented from each separator could be carefully and separately measured.



Vertical section and plan of the new Hickman air separator.

An air reservoir was fitted up for these tests so that a measured quantity of free air could be injected into the pump discharge before that discharge entered separator No. 1. This reservoir was connected at one end to the pump discharge through a small valve and a sight feed glass, and at the other end through valves to the atmosphere and to the city water mains. At the beginning of the test this reservoir was open to atmosphere through the valve at one end and a pipe plug opening at the other. The valve and plug being closed entrapped the air. Then, with the city water main valve closed, the valve to pump discharge was opened and the water from pump came down through the sight feed glass and compressed the air in the receiver. When a condition of equilibrium had been reached, as shown by stoppage of flow through sight feed, the city water was turned into the bottom of the reservoir and the water and air forced back into the pump discharge until the sight feed showed all air expelled and city water dribbling through.

This method of test was tried at various velocities of discharge ranging from 2 feet to 6 feet a second. Of the air introduced into the pump discharge, separator No. 1 collected an average of 85 per cent on the tests at 6 feet per second velocity of flow, and an average of 94.5 per cent on the tests at 2 feet per second velocity of flow. The No. 2 separator collected practically no air.

There were twelve tests made, in each of which 415 cubic inches of air were forced into the pump discharge. Of this total of 4980 cubic inches, the first separator took out 4405 cubic inches and the second separator took out 2 cubic inches.

These tests show conclusively that this new vortex type of Hickman air separator will give a great degree of protection to any machinery subject to corrosion from entrained air. This fact has also been amply demonstrated by experience with this device on shipboard on the steamers of the Matson Navigation Company and other users.

Hickman air separators are to be installed on the new Key System Transit Company ferryboats for San Francisco Bay, now building at the Oakland plant of the Moore Dry Dock Company.

Garlock Steam Packing

THE work of packing machinery against leaks is a very important part of an engineer's business. No matter how high the quality of the packing may be, if it is put in wrongly it will not do the work. Poor workmanship in the installation means leaks of steam, which are costly, and cutting of rods and stems, which is even more costly and means repairs and consequent loss of time. Most engineers are alive to the need of care and skill in this important work; but all engineers will strongly maintain that the primary need of a good job of packing is a first class grade of packing.

In the early days of steam engines, the engine glands were made more or less steam-tight by hemp fiber, soaked in grease, laid up into rope form, hammered, and forced into place. In those days it was also customary to make the packing right on the job, and a good "square packing" braider was always in demand. When the man could also braid a strip of soft rubber into the center of the finished packing, then he was an artist. The latter form of braiding made the packing more resilient and kept the rods tight with less screwing up. But at best the results were unsatisfactory, as the hemp soon burned out and no very long runs could be made without stops to repack. These were the days of low boiler pressures, however, and the old method worked fairly well.

Pressures were later run up to greater tensions and the old style flax or hemp packing was useless. Then a packing known as Tuck's was manufactured. It was composed of a strip of frictioned-with-rubber canvas, rolled tight and with a rubber core. This answered for a time with 50 to 60 pounds steam pressure, but did not wear well. As steam pressures were increased a better article was demanded.

Among the first to start the manufacture of packing on a large scale was the Garlock Packing Company. Their goods were soon found to be of uniform and good quality. As pressures mounted the firm kept pace with the demand, increasing their equipment and putting better material into the product. Garlock packing is now known the world over and is obtainable almost everywhere, the firm having distributing centers at all principal ports and jobbers in almost every town.

Several special packings have lately been made by the Garlock Packing Company, among them the semi-metallic types Garlock 934 and 935. It is claimed that this packing will hold up at working steam pressures of 750 pounds per square inch and at superheats up to 1500 degrees. This packing has only one per cent of organic matter, which is used as a binder. Types Garlock 934 and 935 were made to meet the demands caused by the high pressures and superheats obtained in recent experiments made by a large operating company in its Chicago plant. It is claimed that the packing is holding up well. Another type, Garlock 962, is made for use in the glands of diesel engine fuel pumps that must at times hold over a thousand pounds pressure of very hot oil. It is said that these packing fitted glands are as tight as ground fits and materially cheaper.

But even with high grade packing it has been found necessary to keep a good salesman on the job, and for a good packing salesman a practical engineer is needed. Such a one is associated with the Garlock Packing Company on the Pacific Coast. Most of the marine fraternity know John Hepburn, who for the past twenty years has been with the Garlock organization. Mr. Hepburn is an Australian by birth and learned his profession in the marine shops of that country. He also followed the sea end of the game and gained the British Board of Trade certificate. Leaving Australia thirty-six years ago, he came to San Francisco and became an American citizen. Following his profession, he was employed for some time at the old Union Iron Works as a leading marine machinist. Later he secured his chief engineer's license and was in charge of the engines of several vessels. In his present connection with the Garlock Packing Company Mr. Hepburn has made a host of friends. He has been on several trips to foreign countries in the interest of his firm, having visited New Zealand. China, India, Japan, Australia, and South Africa. In fact, Mr. Hepburn has journeyed over 100,000 miles of ocean as a Garlock representative. Being a skilled engineer and knowing the problems of the craft, he can aid in their solution where a man without technical training would be at a loss.

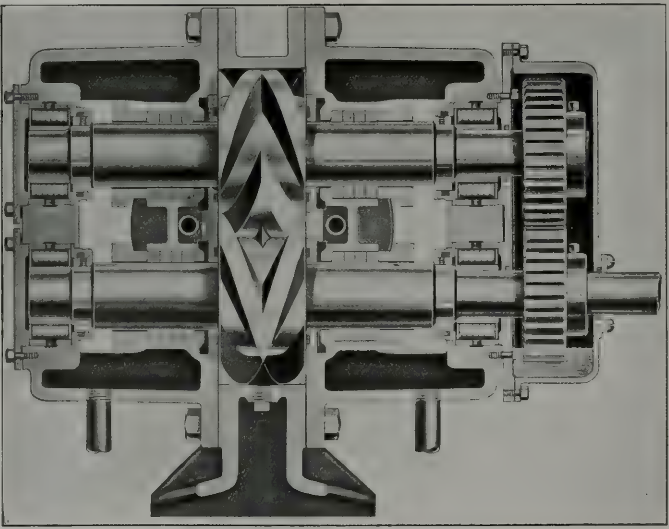
The headquarters of the Pacific Coast District of the Garlock Packing Company are at 671 Mission Street, San Francisco. Claude D. Allen is in charge as manager of the district. A large stock of the various types of Garlock packing is carried, a factory operated, and the organization facilities are at the disposal of all users of steam packing. Competent engineering advice from these packing specialists has solved many packing problems afloat and ashore.

The Heliquad Rotary Pump

THE latest development in rotary gear pumps is the Kinney Heliquad. This pump has been giving great satisfaction wherever used and is especially adapted for handling the lighter distillates of petroleum.

The working members of this pump consist of two cylindrical rotors, on the peripheral faces of which are cut helical grooves in 120-degree phases in such wise that the two rotors when set together in peripheral engagement have interengaging reversed helixes working in peripheral series. The shafts carrying these rotors are supported in roller bearings and are made tight by large stuffing boxes. The lower shaft drives the upper shaft through spur gearing, the gears working in an oil-tight case with lower gear dipping in oil.

The case or cylinder in which the rotors are housed is internally machined to a nice working fit and carries a flanged suction inlet on one side and a flanged discharge outlet on the other.



Reproduction of a wash drawing of the Kinney Heliquad rotary pump with the case laid open showing the rotors, shafts, timing gear, stuffing boxes, and bearings.

The shafts and bearings on these pumps are designed to work under maximum pressure with minimum deflection. The two covers of the pump cylinder are fitted with liquid-tight stuffing box composed of fixed and movable labyrinth rings, and also with a shaft packing gland insuring absolute freedom from leakage. As shown in the illustration, this shaft packing is of very generous proportions so as to avoid binding.

It will be evident that a pump rotor of this character presents a continuous series of cylinders and plungers, interoperating to produce a continuously over lapping series of discharges. The Kinney Heliquad pump in actual operation produces a continuous discharge without a break at practically constant pressure.

Kinney Heliquad pumps are in use in many California refineries and are specified as cargo pumps on the Associated Oil diesel bay tanker now building at the Union Plant of the Bethlehem Shipbuilding Corporation, San Francisco.

Contrapropeller Installations

THE Th. Goldschmidt Corporation reports a number of recent installations of contrapropellers. Among them are the steamship Levisa of the United Fruit Company, the tanker Lightburne of the Texas Company, the tanker Dixie Arrow of the Standard Transportation Company, tanker John D. Archbold of the Standard Transportation, and the tug James Edward of the Great Lakes Dredge and Dock Company.

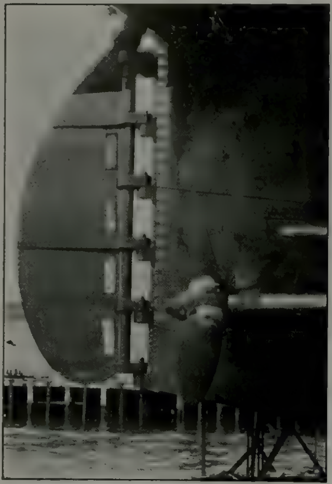
Noteworthy among these is the Standard Oil Company's tanker John D. Archbold, which is a twin screw vessel and which is, so far as we know, the first installation of a contrapropeller on a twin screw American steamer. The installation of the contrapropeller to the tug James Edward marks the second installation for the Great Lakes Dredge and Dock Company, they having had a contrapropeller built into their new tug now being finished at the Manitowoc Shipbuilding Company.

The pictures reproduced herewith show the manner in which the contrapropeller blade is attached to the strut on each outboard hearing. The Ore Steamship Corporation equipped two of its large combination ore and coal steamers, the Lebore and the Marore, with contrapropellers in this same way in 1925 and 1926. This company has always kept a careful record of performance on the steam vessels of its fleet and an inspection of these records shows some interesting comparisons between vessel efficiencies with and without contrapropeller equipment.

In 1925 the Lebore without contrapropeller ran six round voyages from Baltimore to Chile, and with contrapropeller she ran two voyages. Her average fuel consumption per round voyage was 1555 tons with the contrapropeller and 1673 without. This shows an improvement of slightly above 7 per cent and amply justifies the installation. The change in speed is even more marked, the average without contrapropeller being 10.52 knots an hour, and with contrapropeller 11.66 knots an hour, or almost 10 per cent increase.

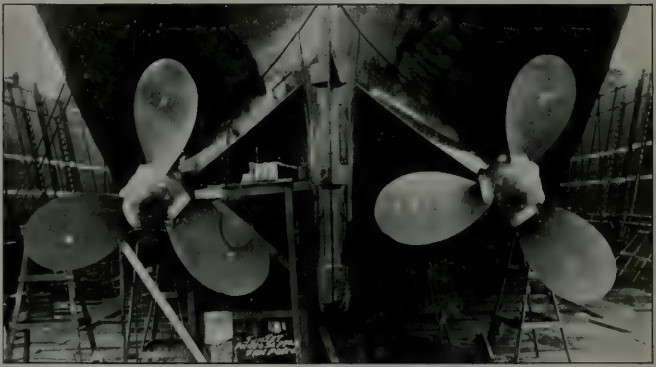
The Marore, converted to contrapropeller early this year, is showing comparable increases in over-all efficiency.

The Bethlehem Shipbuilding Corporation is prepared to install contrapropellers on any single or twin screw vessel.



A TWIN CONTRAPROPELLER

The illustrations show application of contrapropeller blades to the struts of the outboard bearings of the propeller shaft of the Standard Oil tanker John D. Archbold. These pictures were taken by the Sunset Photo Supply Company of San Pedro, while the John D. Archbold was on the dock of the San Pedro Works of the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd.



Dependable Lighting Sets

A DEPENDABLE lighting plant is of paramount necessity on any kind of vessel. On large craft, duplicate and even triplicate sets insure dependableness. On small vessels, like workboats and yachts, dependableness of the unit is even more essential, as lack of space forbids duplication of units. Economy is also a very desirable feature.

The Kohler Company, whose San Francisco offices are at 544 Second Street, have brought out a small unit, self-contained, which it is claimed has features insuring the service expected and demanded.

A representative of Pacific Marine Review recently had an opportunity, through the courtesy of E. P. Mantell Supervisor of Lighting Plant Sales of the Kohler Company, of observing the latest development of these small units in action. What particularly impressed the writer was the rugged construction both in the motive power and the electrical equipment. Everything has been designed to stand hard usage and to hold up under all conditions of service. It was noted that the control of output was very close. Loads from nil to 100 per cent over were shifted without an appreciable fluctuation in voltage. Another test to show the rigid way in which all parts are made was the shorting at full load, back of the main switch. The severe test was repeated several times without harm, bringing the machine to a standstill, and she would pick up and resume duty instantly when short was taken off.

The output of this generating set is standard 110 volt current. Thus standard commercial lamp, fixtures, and fittings are used, making economical maintenance and replacement expense. Again, the starting battery is of the automobile 24-volt type and is only in service when starting, having nothing whatever to do with the load. It is also continually under a "trickle charge of about one ampere, insuring long life and little loss of water or electrolyte.

The mechanical finish of the whole job is excellent. This gives a pleasing appearance appealing to the eye of the engineer. Joints are even, castings smooth, and forgings nicely machined where needed. The design is such that without loss of strength or rigidity weights have been kept down, a point of advantage afloat. A 2000-watt plant, complete, weighs about 500 pounds. Sizes of 800, 1500, and 2000-watts are stocked. and these can be connected in multiple if desired, and the power increased accordingly. All of these sizes are automatically lubricated, started, and controlled, and the builders claim for them advantages not embodied otherwise. In the marine type, cooling water can be taken from the sea, or the regulation radiator can be used.

Many of these plants are afloat on the Pacific Coast and other parts of the world. From repeat orders and reports of service, the buyers have evidently been satisfied with them.

A Kohler 2000 watt unit insures dependable electric lights on the cruising motor yacht Felicia, pictured above.

Taking the Drudgery Out of Dredging

At every step in the march of mechanical progress, man's work is made somewhat easier and less expensive. Thanks to the ingenuity of Pacific Coast engineers in the application of the welding art, even the arduous business of dredging now seems destined to be deprived of much of its drudgery.

What is said to be the longest section of welded pipe ever used for submerged dredging operations has just been completed by the Pacific Coast Engineering Company of Oakland, California, for the Reynolds Dredging Company of New Orleans, Louisiana. The line is 4000 feet long and, through the application of arc welding with Purox standard electrodes and the use of Plummer flexible ball joints, it can be floated as a unit from one dredging location to another. An enormous saving to the contractor in time, labor, and expense over the old method, which involves dismantling the line at each change in location, is thus effected.

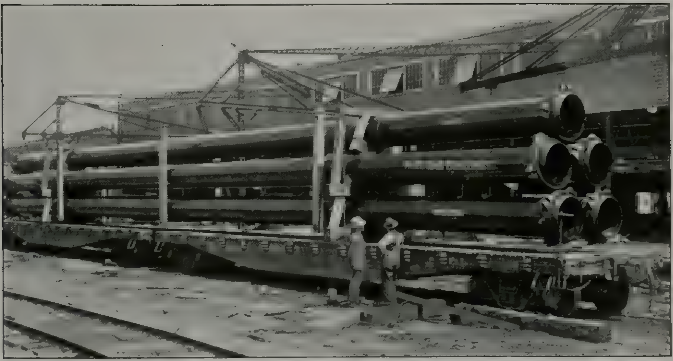
The work for which this line is especially designed is the moving of something over fourteen million cubic yards of dredged material at fourteen different points of operation.

The pipe is formed from ½-inch high carbon steel plates and is 27 inches in diameter. Six lengths are joined together, making each section of the line 98 feet over-all. and these 98-foot sections are then connected with Plummer flexible ball joints.

Both longitudinal and circumferential seams are welded with the electric arc and are reinforced with butt straps which are also welded in place, as shown the illustration. The butt straps serve to reinforce the seams so that they will withstand the tremendous strains involved in hydraulic dredging.

The Reynolds Dredging Company was so anxious to get this dredge pipe that it was shipped by rail instead of by water, despite the additional expense of rail transportation, and the fact that it was built on the Pacific Coast by a western engineering firm is a distinct tribute to the enterprise and skill of the Pacific Coast Engineering Company.

That Purox standard electrodes were used throughout in the welding operations is likewise a tribute to their uniform quality and adaptability to work of this exacting character.



Five 98-foot sections of 27-inch diameter steel dredge discharge line loaded on two cars at the Oakland, California, plant of the Pacific Coast Engineering Company for shipment to New Orleans.

Trade Literature

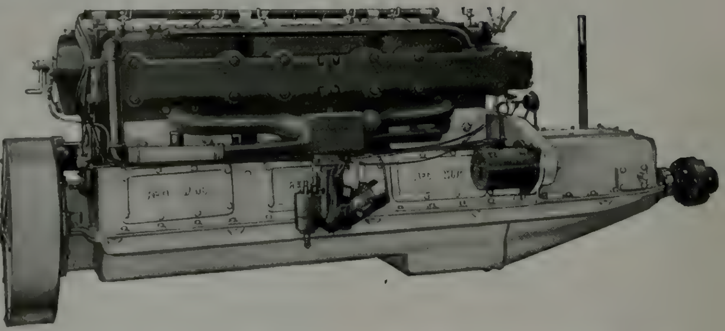
Direct-Injection Oil Engines for All Purposes is the title of a publication just issued by the **Ingersoll-Rand Company, New York.** The cover, which is printed in colors, illustrates the major title by portraying the Ingersoll-Rand oil engines as applied to railway, marine, power-house, industrial, and building applications.

The text matter, which consists of technical data and details of their "PO" oil engines of 55, 110, and 150 b. horsepower sizes, is profusely illustrated by 42 illustrations of plant layouts, installation views, diagrams, and engine details.

The applications for the P.O. oil engines are suggested by views of installations at the Borough of Freehold, N.J.; Cape May Water Works, N.J.; Lehigh Sand & Gravel Co., Whitehaven, Pa.; Point Breeze Plant, Atlantic Refining Co.; Clarendon Marble Co.; Manchester, Vt.; Pure Oil Pipe Line Co.; Meadow Brook Country Club, Meadow Brook, Long Island; Westbury Water Works, Westbury, Long Island; Oyster Bay and Hempstead Water Co.; Merrick, Long Island, and the Rock Crushing Plant at Stone Quarry operated by the Highway Contractor.

A copy of this publication is available to executives and engineers on request by addressing the Ingersoll-Rand Company, 11 Broadway, New York, or any of their representatives in the principal cities of the United States and all foreign countries.

Clean Lubricating Oil



Big Chief Special Six Red Wing Thorobred marine motor with a Purolator fitted in the lubricating oil system.

THE lubricating oil of any internal combustion engine rapidly accumulates a supply of dirt, hard carbon, and tiny metal particles that, if unchecked, forms a grinding compound which is forced into the bearings. Rapid wear then results, with all of the attendant ills that a motor can and will develop if lubrication is faulty. Changing the oil frequently provides clean oil at intervals, but does not prevent a flow of dirt to the bearings between renewals of the oil; for the new oil begins its accumulation of dirt just as soon as it is put into the engine. Part of this dirt comes from outside sources, nevertheless, a very large percentage comes from the inside of the engine itself. Hard particles of unconsumed carbon and minute scrapings of metal form a very large percentage of the total amount of foreign solids to be found in old oil removed from any internal combustion engine.

The only method of eliminating this condition entirely is to keep the oil clean at all times. Purolator is the oil filter that accomplishes this purpose. Its filtration is entirely microscopic and no solid particles of any kind are to be found in the lubricating oil of a Purolator-equipped engine. Purolator made its first success in the automotive field and has been adopted as standard equipment by the leading cars today, among which are Buick, Cadillac, Chrysler, Diana, Flint, Nash, Oakland, Peerless, and Studebaker.

In addition to these passenger cars it is now used as standard equipment on trucks and also by the manufacturers of tractors and farm machinery.

Although the oil of a marine engine is not subjected to contamination from road dust, as is a passenger car or truck, the marine engine usually operates at maximum power output, and such heavy duty increases to a very great extent the wear resulting from any contamination in the oil whatever.

The manufacturers of Purolator make no claim whatever that the Purolator removes or corrects dilution of the oil, but even a diluted oil, perfectly free from any solid particles, causes practically no wear on bearings as compared to a diluted oil filled with solid abrasive particles.

Purolator is now being used as standard or as optional equipment on some of the well-known marine engines manufactured today, and it is reasonable to believe that as it becomes known to the marine world, its use on marine engines will be almost as universal as on automotive engines. It can be installed without change of engine design on any marine engine having a full force feed lubricating system.

A Well Designed New Oil Burner

If a new type of oil burner is developed the makers usually claim that the device will save great quantities of fuel oil in addition to many other advantages. However, the General Engineering Company, who have lately placed the Fox Fuel Oil Burner on the market, make no such claims. They do assert, however, that their burner is simple, strong, easily adjusted for varying conditions, and that it will stand up under the severest work.

Judging from the appearance of the burner and its furnace front arrangements these claims are well founded. By a very simple gear and pinion adjustment, the air admission to the furnaces can be regulated to a nicety. Another feature is the ease of removal of tips, strainers, and even the whole burner.

Fox fronts are designed to permit of the door swinging either right or left. This door opens a space sufficient to allow entrance to furnaces without removal of brickwork, a very desirable feature. The use of metallic flexible pipe for the oil line lead to burner is another change from old practice.

The builders state that a much lower oil pressure can be carried than in some other types. This will be looked on with favor by operating engineers, as a lowering of high oil pressures used with mechanical atomizers is of great advantage.

The steamers Lake Superior and Correallis were recently fitted with six each of these new burners, and the engineers state they are very satisfactory, giving fine results. Several other orders are booked for different vessels.

New Books

The Motor Boat & Marine Motor Manual. Compiled and illustrated by the staff of "The Motor Boat." 185 pages, profusely illustrated with half-tone engravings, drawings, graphs, etc.; bound in blue with semi-flexible cover; published by Temple Press, Ltd., 7 Rosebery Avenue, London, E.C.1. Price 5s. net.

This handy little book is small enough to fit in one's pocket and is a work of technical instruction providing all the essential information needed on the subject of pleasure and commercial motorboats and their machinery. The book contains 18 chapters dealing with different phases of motorboat construction, types of boats, propellers, engines, auxiliaries, fuels, navigation, and lubrication.

Elements of Radio Communication, by Ellery W. Stone. 433 pages, 220 illustrations, 56 plates; bound in blue buckrum with gold stampings; published by D. Van Nostrand Company, 8 Warren Street, New York. Price $2.50.

This a third edition of a new work on a comparatively new subject, it attests the popularity of the book and of its author, Ellery W. Stone, a lieutenant commander of the U. S. Naval Reserve, and well known as president of the Federal Telegraph Company. The book discusses the theory and practice of radio reception in easily understandable terms, recognizing the new devices and improvements which have become popular within the past year. Plain language, a pleasing literary style, logical handling of disputed methods, and, above all, a direct appeal to everyone interested in radio, it presents the subject without recourse to involved mathematics and physics.

Marine Insurance

Edited by JAMES A. QUINBY

The Abuse of the Open Policy

THE so-called "open policy" is ordinarily a contract whereby the assured agrees to declare and the insurer agrees to accept and cover, at specified rates, all goods of a named class which are shipped at the risk of the assured in approved vessels between specified ports, subject only to a limitation as to the maximum value which may be insured per a single vessel. The agreement is usually written to run for an indefinite period and may be cancelled on thirty days' notice by either party.

Contracts of this general classification, differing but slightly in detail, have been variously labeled "open covers," "contract policies," and "open contracts." These distinctions in terminology make but little appeal to the average mind. In fact, Chlorine, our pet stenographer, says that an open cover differs from a blanket policy in that the latter should be used only in winter.

Under the open type of policy, certain benefits naturally accrue to each of the contracting parties. The underwriter is theoretically assured of a steady and increased volume of premiums, while the assured is enabled to include under his coverage any and all shipments at his risk, even though these may not be declared, or evidenced to the underwriter, until the carrying vessel has reached her port of destination. With such a policy, a merchant may even declare goods of whose very existence he is ignorant until they arrive in a damaged condition.

MISSING

S. S. SUDUFFCO

Hail and Farewell—
From those of us who stop shore-side
To thee,
Whose ever cruising spirit quests the tide,
We give fair seas
To waft thee unafraid
Down that dim course
The Master Pilot laid.

Though other keels
May trace thy wake from shore to shore,
Our bordereaux
Shall bear thy name no more—
To thee the phantom watch,
The Lutine bell—
Full speed—
We give thee Hail—
And fare thee well.

Under the conditions now obtaining in the intercoastal and foreign trade, it is quite common for goods to precede shipping documents, and the declarations of the Pacific Coast consignee under his open policy are therefore almost uniformly subsequent to the arrival of the subject matter insured. It may easily be seen that this puts the underwriter at the mercy of the assured and opens the door to numerous irrigularities of conduct which may range from downright fraud to the less criminal but equally vital matters of ignorance and carelessness. Cases of intentional fraud are rare, but the lesser "sins of omission" which may be traced to the policy-holder or his servants are all too numerous.

The classical example of the Chinese merchant who made declarations under his open policy only when goods arrived damaged is too well known to require comment. When reproached for his tactics, he was puzzled. What was the sense of insuring things which arrived sound? But when the matter was explained, he proved true to his racial trait of unswerving honesty and cheerfully paid up all his back premiums.

Duty of Assured.

The average American would probably fall somewhat short of this Chinese, both in the extent of his shortcomings and his honesty. He watches the first four or five declarations with scrupulous care. After that, insurance becomes a routine matter to be handled by a subordinate—who is not always competent. Odd shipments are overlooked here and there, always to the prejudice of the underwriter, for these errors are immediately and enthusiastically rectified in cases where damage appears. In justice to the assured, it must be admitted that all omissions would be as readily corrected were some means discovered to bring them to his attention. But in the absence of a loss, the matter is apt to be closed, and the insurer is robbed of his premium just as surely as if the merchant had turned yegg and rifled the cash from his vault.

To look at it in a more technical way, the failure to declare constitutes a breach of contract making the policy voidable at the option of the insurer. While the persuasive voice of expediency weighs heavily against such arbitrary action, the assured is nevertheless endangering his coverage when he fails to declare a single shipment; for by his contract he agrees to pay premium, not on half, nor even on ninety-nine percent of his goods at risk, but on the entire spread of his business.

Value Declaration Important.

Nor is the complete omission of declarations the only way in which the assured may determine his coverage. The same or similar results may follow the failure to declare up to the full value agreed upon in the contract. It is customary, for example, to value goods for insurance purposes at invoice, plus an agreed percentage of anticipated profit, plus prepaid and/or guaranteed freight. It follows that the failure to enter either of these additional increments of value under a contract providing for their inclusion constitutes a breach of the same nature as the omission of the entire shipment.

The open policy is unique in the absolute dependence it places upon the moral integrity of one of the contracting parties. It may almost be said to constitute the assured a trustee for the interest of the underwriter.

If this convenient type of coverage is to reach its highest efficiency, therefore, it is necessary that the assured appre-

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ciate the full measure of his responsibilities under the policy, and make a determined effort to live up to them. The result will be a maintainance of protection beneficial to the individual and an elimination of haphazard declarations, which, in the long run, will bring about a readjustment of the ratio between premiums and losses and lower the cost of insurance to the entire class of those who ship by sea.

A Flash in the Dark

(In One Act and an Epilepsy)

"NOW, Captain, tell us in your own words just how you happened to pile your steam schooner on the rocks."

"V'ell, Ay tank it bane about dark v'n Ay put in for the mouth of the river, a settin' her course on Channel Light Number One."

"Yesyesyes—Go on....."

"Every'ting vos fine. She's spankin' right along, and, and—"

"And then what?"

"V'ell, just afore she struck, I see it ain't the Channel Light at all....... It's a autymobile......"

? ? ? ? ? ?

(Yes, Genevieve....In a case of this sort we advise recovering under the auto owner's public liability policy. And moreover, this just shows that every good citizen ought to get behind the anti-glare ordinance.)

A New Limitation of General Average

THE justly famous—and, to some, notorious—institution of general average has been embedded in the law maritime ever since the Greek shipowner was the best of moral hazards and the trireme a preferred risk. During that considerable time, not a few downright attempts have been made upon its life, on the theory that matters would be simplified for all concerned if marine losses were allowed to rest where they fell.

It has been held that the existence of general average does not depend upon contract, but that it arises from custom and is an integral part of every sea shipment. The manner of adjustment, however, is a proper subject of agreement in the contract of affreightment, as witnessed by the almost universal inclusion of the York-Antwerp Rules in these documents.

A certain trans-oceanic steamship line has recently added a clause to its already voluminous bill of lading, which, while not actually destroying the adjuster's visible means of support, is so worded as to hobble the good ship General Average by the imposition of a franchise which will keep its efficiency well below 2.75%......(Beat that for a mixed metaphor.)

The clause in question is in addition to the usual provision for York-Antwerp Rules, and reads as follows:

"General Average loss to be borne by those on whom it has fallen unless statements are required in writing by interests which would be entitled to receive in the aggregate per adjuster's estimate not less than £1000 net"

The immediate intent of the new clause is quite apparent. Its purpose is to prevent a cargo owner with a small potential credit balance from forcing the ship to have an adjustment drawn up. Presumably the ship herself would have to show an estimated recovery of over £1000 in order to take advantage of a general average in her favor.

So, as far as it concerns the primary interests of the parties to the bill of lading, the provision it at least equitable, and possibly commendable, since it promises to reduce the irritation and delay attendant upon the preparation of minor averages, and to lessen the number of cases in which the shipowner acts as trustee for the cargo in obtaining secruity. The clause appears to be ironclad. The shipper could not escape its effect in cases of sacrifice, nor could the ship avoid its prohibitory nature even in regard to expenditures as distinguished from sacrifices. This is deduced from the use of the phrase "General Average loss", which in the Marine Insurance Act of 1906 (Sec. 66-(1)), is defined as "a loss caused by or directly consequential on a general average act." The section goes on to say that it "includes a general average expenditure as well as a general average sacrifice."

But no matter how worthy the clause may seem as between ship and cargo, it will probably be unfavorably regarded by insurers of these interests. Without the clause, a cargo underwriter who has paid under his policy the insured value of an underdeck jettison, for example, naturally expects to recover at least a major portion of it as an allowance in general average. He is subrogated to the right of his assured as against other parties in the venture and is automatically affected by any restrictions incorporated in the bill of lading. Under the new clause, the door to such recovery is barred to the insurer in all cases where a request for adjustment is not submitted in writing by interests representing a £1000 credit balance. Cases might even be imagined where the aggregate exceeded this sum, but through carelessness or undue influence, the necessary requests by some of the interests were never made.

On the other hand, it may be pointed out that cargo underwriters as a class do not stand to lose by the innovation, since they will be freed from the duty of contribution to the excluded class of general averages. An argument of such general nature, however, will almost certainly fail to appeal to the individual insurer, who will be inclined to take refuge behind an increased premium on shipments where the new clause appears in the contract of carriage.

The Trend of Personal Injury Cases

Since the days of Southern Pacific Co. v. Jensen, 244 US 205 and Knickerbocker Ice Co. v. Stewart, 253 US 149, the jurisdiction of semi-maritime personal injury cases has

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been a bone of contention between Federal courts and Workmen's Compensation bodies in the several states. In the Knickerbocker case, Justice McReynolds of the Supreme Court, in holding unconstitutional an Act of Congress of 1917 which undertook to extend to seamen full rights as claimants under the compensation laws of the various states, said:

> **"Without doubt Congress has power to alter, amend, or revise the maritime law by Statutes of general application embodying its will and judgment. This power, we think, would permit enactment of a general employers' liability law or general provisions for compensating injured employees; but it may not be delegated to the several states. The grant of admiralty and maritime jurisdiction looks to uniformity; otherwise wide discretion is left to Congress."**

This reference to uniformity is the keynote of the refusal contained in certain leading cases to extend the power of the compensation bodies beyond the shore-line, or at least beyond the gang-plank. The first indication that "uniformity" was not a standard to be inflexible in its application occured in Grant Smith-Porter Ship Co. v. Rohde, 257 US 469.

In that case, one Rohde, a carpenter, was injured while at work on an entirely new vessel, which although not yet in commission, was afloat in navigable waters. The United States Supreme Court upheld the jurisdiction of the Oregon Compensation Law, pointing out that the result could not interfere with the harmony of international or interstate commerce.

> **"The contract for constructing the Ahala was non-maritime, (said Justice McReynolds) and although the incompleted structure upon which the accident occured was lying in navigable waters, neither Rohde's general employment nor his activities at the time had any direct relation to navigation or commerce......Under such circumstances regulations of the rights, obligations, and consequent liabilities of the parties, as between themselves, by a local rule would not necessarily work material prejudice to any characteristic feature of the general maritime law, or interfere with the proper harmony or uniformity of that law in its international or interstate relations."**

In the same decision, the learned Justice also took occesion to include the following sentence:

> **"As both parties had accepted and proceeded under the statute by making payments to the Industrial Accident Fund it cannot be properly said that they contracted with each other in contemplation of the general system of maritime law."**

Grant Smith-Porter Case Misunderstood.

This reference caused much speculation among the legal fraternity, many of whom assumed that the case rested entirely upon the voluntary nature of the Oregon law. Although this assumption was somewhat shaken in subsequent cases, of which Washington v. Dawson, 264 US 219, is typical, it was not until February of the present year that the Supreme Court clearly announced that its "uniformity" doctrine in the Grant Smith-Porter case was not restricted by an incidental comment on the local compensation act.

The announcement in question is found in Justice McReynolds' decision in Miller's Indemnity Underwriters v. Braud, reported in 1926 A.M.C. 310. In that case the plaintiff's intestate, a diver, met his death through the failure of the air supply while submerged from a floating barge anchored in the navigable Sabine River. His employers' insurers contended that the claim for death compensation really arose from a maritime tort, and that the rights and obligations of the parties should be fixed by maritime law. The court took the opposite view, however, and affirmed the decision of the Supreme Court of Texas in the following words:

> **"This subject was much considered in Grant Smith-Porter Co., v. Rohde, 257 US 469, 477,—here on certificate—which arose out of injuries suffered by a carpenter while at work upon an uncompleted vessel lying in navigable waters within the State of Oregon. The words of the local statute applied to the employment and prescribed an exclusive remedy. We said the cause was controlled by the principle that, as to certain local matters regulation of which would work no material prejudice to the general maritime law, the rules of the latter may be modified or supplemented by State statutes. And we held that under the circumstances disclosed 'regulation of the rights, obligations, and consequent liabilities of the parties, as between themselves, by a local rule would not necessarily work material prejudice to any characteristic feature of the general maritime law, or interfere with the proper harmony of uniformity of that law in its international or interstate relations.' Stressing the point that the parties were clearly and consciously within the terms of the statute and did not in fact suppose they were contracting with reference to the general system of maritime law, we alluded to the circumstance, not otherwise of special importance, that each of them had contributed to the industrial accident fund.**
>
> **"And answering the certified questions we affirmed that 'the general admiralty jurisdiction extends to a proceeding to recover damages resulting from a tort committed on a vessel in process of construction when lying on navigable waters within a state.' Also, that 'in the circumstances stated the exclusive features of the Oregon Workmen's Compensation Act would apply and abrogate the right to recover damages in an admiralty court which otherwise would exist.'**
>
> **"In the cause now under consideration the record disclses facts sufficient to show a maritime tort to which the general admiralty jurisdiction would extend save for the provisions of the State Compensation Act; but the matter is of mere local concern and its regulation by the State will work to material prejudice to any characteristic feature of the general maritime law. The Act prescribes the only remedy; its exclusive features abrogate the right to resort to the admiralty court which would otherwise exist."**

The doctrine here enunciated has since been approved in The President Arthur, New York Appellate Division, March, 1926, and in City of Oakland v. Industrial Accident

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PACIFIC MARINE REVIEW
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Commission of the State of California, California Supreme Court, March, 1926, the latter a case involving an injury to a donkeyman while on a barge in an arm of the San Francisco Bay. Our friend Warren Pillsbury, then attorney for the Commission, successfully contended for the application of the rule in the Grant Smith-Porter and Millers Indemnity cases. (Supra).

Comment.

The trend of the cases here cited is interesting to the shipowner and underwriter in that it discloses a gradual widening of the class of cases in which state compensation acts are allowed to set the measure of the employer's liability, and consequently, of the insurers' liability. It is to be hoped that the long-awaited Federal Compensation Act will afford the insurance fraternity a definite and tangible yard-stick with which to measure the risk of workmen in maritime pursuits.

Freights, Charters, Sales

May 18, 1926.

SINCE our last report dated April 14, the United Kingdom wheat market has shown some life and many charters have been taken for May/June at 27/6 to 30/-, and for August/September new crop at 30/- to 31/3.

Japan lumber is quieter with a slight weakening of rates to $9.50. Australia lumber is quiet with rates still around $13. Intercoastal is weak with rates quoted as low as $10, although we have no confirmation lower than $11.

West Coast of South America lumber rates are about the same at $12 to $13.

There has been practically no new crop barley business closed as yet and liners are asking 30/- to 35/-, depending upon ports and the amount of tonnage each has to fill.

The following fixtures are reported for the United Kingdom/Continent: British steamer Benrinnes, 23/6, Wm. H. Pymn, Jr., June; British steamer Jerseymoor, 28/9, May; British steamer Kenilworth, 30/-, prompt; British steamer Sithonia, 30/-, June; British steamer Polyphemus, 28/3, Kerr Gifford & Company, June; British steamer Glenshane, wheat; British steamer Bencleuch, Kerr, Gifford & Company, May; Jugo-Slav. steamer Marija Petrinovic, wheat, Balfour Guthrie & Company, May; British steamer Benmacdhui, Strauss & Company, May; Norwegian motorship Ferndale, Kerr Gifford & Company, June; British motorship Vinemoor, 28/6, Balfour Guthrie & Company, May; British steamer Holtby, wheat, May/June; British steamer Poleric, barley, May; British steamer Bendoran, June; Norwegian motorship Trianon, Columbia River or Puget Sound loading, 28/9, option British Columbia, 27/6, Strauss & Company, May; Belgian steamer Belgier, Portland or Puget Sound loading 31/-, option Vancouver 30/6, August/September; Danish steamer Arabien, grain, 30/-, Balfour Guthrie & Company, June; British steamer King City, same charterers, June.

The Danish steamer Cornelia Maersk is reported fixed with grain from British Columbia to Callao, June loading, by Balfour Guthrie & Company.

The following steamers are reported fixed with lumber to the Orient: British steamer Argalia, Japan, 75c, May, W. L. Comyn & Company, British steamer City of Victoria, Japan, piles, prompt loading, M. Nakata & Company; Danish steamer Arabien, Japan, H. R. MacMillan Export Company, Ltd.; Japanese steamer Malta Maru, Japan, April/May, Nakagawa & Company; American motorship Seekonk, Shanghai, May, Dant & Russell; Japanese steamer Taibu Maru, Japan, May, Nakagawa & Company; Japanese steamer Koyu Maru, Japan, May, Yamashita Company; British steamer Atlantic City, Japan, $10, May; American steamer Monticello, Shanghai, June, Dant & Russell; British steamer Skegness, Japan, $10; British steamer Cragness, Japan, $10; Japanese steamer Yonan Maru, Japan, $10.25, May; British motorship Inverbank, Orient or Australia, May, Pacific Export Lumber Company; Norwegian steamer Hardanger, Japan, May; Japanese steamer Juyo Maru, Suzuki & Company; Japanese steamer Kashu Maru, Japan, May/June, Yamashita Company; Japanese steamer Milan Maru, Japan, Nakagawa & Company, May/June.

The German steamer Lisbeth is reported fixed from Columbia River to Callao with lumber by J. J. Moore & Company, Inc. and the American Barkentine Monitor, from Puget Sound to West Coast of South America by Otis, McAllister & Company.

The following steamers are reported taken on time charter: British steamer Norwich City, Pacific trade, 4 months, delivery Vancouver, $1.05, May; Norwegian motorship Brynje (new), Pacific trade, delivery North Pacific, June; British steamer Glentworth, one trip intercoastal, delivery British Columbia, lumber, $1.60, June, H. R. MacMillan Export Company; Swedish steamer Siljan, British Columbia to North of Hatteras, May; Norwegian steamer Rigi, delivery Australia, redelivery Australia, May, J. J. Moore & Company, Inc.; Norwegian steamer Astoria, 9 months, Pacific trade, $1.40, H. R. MacMillan Export Company, Ltd.; Belgian steamer Caledonier, British Columbia to North of Hatteras, delivery North of Hatteras, one trip, May; British steamer Kalimba, one trip British Columbia to North of Hatteras, delivery North Hatteras, 80c, May.

The following sales are reported: American schooner Annie M. Campbell, J. E. Shields to Mexican parties; American steamer Coloradan, (ex-Oregon) and Honolulan (ex-American), American Hawaiian Steamship Company to General Metals Supply Co. to be scrapped (terms private).

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Pacific Port Construction Program

Needed---Equipment for Pacific Coast

West Coast Port and Harbor Improvement Program.

The immediate future is to see the materialization of many projects and plans for the improvement of all the harbors on the West Coast of North and South America—from Alaska to Chile.

Of the $45,000,000 recently appropriated by Congress for rivers and harbors improvements, the following is a list of sums to be expended on the Pacific Coast:

California.

San Diego, $69,000.
Los Angeles harbor, $900,000.
San Luis Obispo harbor, $20,000.
San Francisco harbor, $160,000.
Redwood creek, $500.
Oakland harbor, $275,000.
San Pablo bay and Mare Island strait, $325,000.
Suisun Bay channel, $15,000.
Suisun channel, $500.
Napa river, $1000.
Petaluma creek, $1000.
San Rafael creek, $1000.
Humboldt harbor and bay, $500,000.
Crescent City harbor, $1000.
Noyo river, $3000.
San Joaquin river $25,000.
Stockton and Mormon channels (diverting canal), $3000.
Sacramento river, $95,000.

Oregon.

Coquile river, $8000.
Coos bay, $545,000.
Coos river, $22,000.
Siuslaw river $25,000.
Yaquima bay and harbor $54,000.
Tillamock bay and bar, $135,000.
Snake river, Washington, Oregon, and Idaho, $1000.
Columbia and lower Willamette rivers, below Vancouver, Washington and Portland, Oregon, $300,000.
Clatskanie river, $5000.
Willamette river above Portland and Yamhill river, $21,000.

Washington.

Seattle harbor, $20,000.
Survey of northern and northwestern lakes, $145,000.
Skamekaw creek, $2000.
Willapa river and harbor, $1000.
Grays harbor and bar entrance, $185,000.
Puget sound and tributary waters, $24,000.

Alaska.

Wrangell narrows, $175,000.

Hawaii.

Honolulu harbor, $150,000.
Hilo harbor, $390,000.
Nawiliwili harbor, $180,000.

Pearl Harbor, Hawaii, to Have Extensive Improvements.

The Navy Department has asked for $19,177,500 for the following improvements at Pearl Harbor, Hawaii:

One large floating drydock at naval station, $5,000,000;
Waterfront improvements, $1,500,000;
Submarine base improvements, $275,000;
General facilities building, $290,000;
Facilities for changing submarines, $245,000.
Miscellaneous buildings and improvements $915,000.

Outfitting Pier at Puget Sound.

The new general Fitting Out Pier at Puget Sound Navy Yard, Bremerton, Wn. is to receive an appropriation for crane and accessories to cost $1,310,000; machine and electric shop, $1,000,000; equipment house, $100,000; paint and oil storehouse, $125,000.

Large Warehouse for Oakland.

Lawrence Warehouse Company, Oakland, California, Al T. Gibson, president, has announced plans for the construction of a harbor terminal warehouse to cost $500,000. O'Brien Brothers, Inc., 315 Montgomery Street, San Francisco, are architects.

The terminal (to be known as the Gibson terminal) will occupy the block facing the inner harbor and will be bounded by Water, Franklin, First, and Webster Streets.

City of Oakland Ready to Proceed With Port Development.

Bids have been asked for dredging of San Antonio estuary channel at Livingston Street and the Dennison Street wharves as the first step in the $10,000,000 port development program. This initial dredging is for the deepening of this channel for the accommodation of deep draft lumber vessels at Livingston and Dennison Street Wharves.

Bids for the sale of the first $2,000,000 of the $9,860,000 harbor bonds will shortly be asked to provide funds for the execution of the city's plans. The first unit will consist of construction of a permanent wharf at the foot of Grove Street to cost $1,000,000. The second unit will be the construction of a quay wall on the Western waterfront to cost $1,500,000. Plans are being prepared but exact type of piling and several other features have not yet been definitely decided. Complete plans and description of this program were published in the February 1926 issue of Pacific Marine Review.

New Port at San Francisco.

Great interest is being manifested in a report forwarded by the Secretary of War to Congress recommending dredging work to open a 34-foot channel into Islais Creek, San Francisco, thus enabling the so-called Mission Harbor to be drained and dredged and made available for docking of ocean-going ships close to the Mission and Bay View districts. This is the most important potential manufacturing and industrial district of San Francisco. The cost of the dredging would be $146,000, with an annual maintenance cost of $25,000.

Long Beach to Prepare for Industrial Waterfront Plants.

Long Beach City Council has appropriated $130,000 to $140,000 for widening and deepening to 32 feet, 2900 feet of channel between Badger Avenue Bridge and Long Beach turning basin. When this is ready the Union Pacific is prepared to open its holdings to terminal and industrial sites.

Los Angeles Harbor.—A T-shaped wharf in fish harbor, Terminal Island, will be built as soon as plans are completed. George Nicholson is engineer.

Western Oil and Refining Company will build a marine oil loading station on West Basin, Wilmington, to enable the company to load directly onto tank steamers from their new refinery.

Stockton. — City Manager C. E. Ashburner has recommended the purchase by the city of eight acres of Banner Island in the heart of the city adjoining the Stockton Channel for a turning basin in their harbor project.

Astoria.—The Shell Oil Company is building a distributing station at the Port of Astoria terminals.

Olympia, Wash.—T. E. Jones of Seattle was awarded contract May 3 for the construction of a new port district wharf, to be 600 feet long, and 110 feet wide, for $52,371.75. The new pier will connect with the present 60-foot pier and will extend along the deep water channel and back to the fill completed about a year ago.

Grays Harbor.—The Union Oil Company of California, with headquarters at Los Angeles, have completed plans for the construction of an addition to their distributing plant to cost in the neighborhood of $150,000. Improvements will include new pumping station, tanks, and spur track.

Westminster, B. C.—Plans have been drawn up by C. D. Howe & Co., elevator engineers of Port Arthur, for the construction of a grain elevator for the New Westminster Harbor Board, and authority to dispose of $700,000 bond issue has been given by the Dominion Government. W. G. Swan is consulting engineer for the New Westminster Harbor Board.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

SHIPBUILDING WORK IN PROSPECT

Southern Pacific To Build Three Ferry Boats.

The Southern Pacific which operates a passenger and auto ferry system across San Francisco Bay called for bids in May for the construction of three to five modern screw driven auto ferries. The company now operates 23 boats in its ferry service. The estimated cost of the new boats is $525,000 each.

The new boats will be of steel construction and have a capacity for 80 automobiles. Provision is made for comfortable seating of 500 passengers and a dining room to serve 50 persons at one time.

The boats will have a 256 foot length over-all, and beam of 44 feet 10 inches. Hull will have 19 feet 9 inch depth at center. Draft will be 11 feet 3 inches. Displacement is 1700 tons. They will be diesel-electric driven with 1600 shaft horsepower.

The company plans, in addition to the ferryboats, improvement of their facilities by the construction of a third slip at the Oakland pier, and the improvement of the San Francisco vehicular ferry terminal. They have also announced that they will extend their vehicular ferry service to Alameda. The total cost of ferry service improvements is stated by F. L. Burckhalter, first assistant general manager, to be $1,750,000. Charles Green, at the West Oakland Shipyard, is architect and engineer of the San Francisco ferry service.

Coast Guard Invites Construction Bids.

The United States Coast Guard, has awarded contract to American Brown-Boveri Electric Corp., on a bid of $63,000 each, for building 35 motor boats, estimated to cost in the neighborhood of $2,000,000. The boats will be of steel construction, 125 feet over-all, 23 feet 6 inches molded beam, and have a loaded displacement of 220 tons. The boats will have twin screws and diesel engines developing 300 shaft horsepower.

Delivery of the boats is to be on the Atlantic Seaboard; the first six must be completed on or before December 31, 1926; seven on or before January 31, 1927; 8 by February 28; 9 by March 31; and the remainder by April 15. Other bids for building of the chasers were as follows: Newport News, $65,600 each; Bethlehem, $71,950; Sun Company, $93,300; Federal yard, $93,500, and Carl Hartman Company, $96,200 each.

City of Portland Plans Fireboat.

While the chief of the Portland Fire Department has recommended that three fireboats be provided to protect the city's waterfront property, the plans are far from completed, and the actual construction will depend on the favorable action of the voters on a bond issue at the November elections.

I. M. M. to Build Two Additional Liners.

While the original plans of the International Mercantile Marine Company were to build three trubo-electric liners for the intercoastal service of the Panama Pacific Line, no further action will be taken until the details of the first of these ships now building at the plant of Newport News Shipbuilding & Drydock Company have been worked out and the practicableness of the designs and equipment assured.

Steamship Minnewaska on drydock No. 2 of the Morse Dry Dock & Repair Co., Brooklyn, N.Y.

Additional Coast Guard Cutters.

The House of Representatives recently passed a bill providing for the construction of four additional Coast Guard cutters costing $3,600,000. Under the proposed plan the cutters are to be built in Pacific Coast shipyards. The bill provides for ten cutters in all, the remaining six to be for patrol service other than in Pacific waters. The bill is now before the Senate.

Vessels for C. G. M. M.

The following Canadian shipyards have been asked to submit bids for the construction of five or six motorships for the Canadian Government Merchant Marine service between Canada and the West Indies.

West Coast: British Columbia Marine Ltd., Vancouver; J. Coughlan & Sons, Vancouver; Burrard Drydock Co., North Vancouver; Victoria Machinery Depot Co., Victoria; Yarrows, Ltd., Esquimalt; and Prince Rupert Drydock & Shipyards, Prince Rupert, all in British Columbia.

East Coast: St. John Drydock & Shipbuilding Co., St. John, N. B.; Halifax Shipyards, Ltd., Halifax, N. S.; Davie Shipbuilding & Repairing Co., Lauzon, Que.; Canadian Vickers, Ltd., Montreal.

Fire Fighting Apparatus for Vancouver.

The Vancouver Harbour Commissioners, Vancouver, British Columbia, have under consideration the construction of a berthing tug that may be equipped with auxiliary fire fighting apparatus for harbor protection.

Additional Fireboat for Seattle.

Seattle City Council through the Finance Committee on May 6 recommended an ordinance to be submitted to the voters appropriating $200,000 for a new fireboat for Elliott Bay. No action has been taken on the recommendation.

Reconditioning of Mount Vernon.

Owing to the limit of 90 days set for the completion of the work, the four shipyards interested in the contract for reconditioning the steamship Mount Vernon for the Shipping Board, declined to present bids on May 15, the date set for the bid opening.

The Newport News Shipbuilding and Drydock Company, the Todd Shipyards Corporation, New York, the Morse Drydock and Repair Company, New York, and the Bethlehem Shipbuilding Corporation, Ltd., of Fore River, Mass., all expressed a desire to bid but stated that they would be unable to complete the work within the time limit.

New specifications are now being drawn by the Fleet Corporation with June 8 as the tentative date for opening bids. In the new specifications a 90-day time limit will be included, but there will be a clause permitting shipyards to fix time limits of their own in their bids. New advertisements have been sent out by President E. E. Crowley.

New Boats for Matson Line?

Simultaneous with the announcement of the purchase by the Matson Navigation Company of the Oceanic Steamship Line has appeared a rumor that the Matson company contemplates the construction of two passenger and freight vessels to replace the steamers Sonoma and Ventura which have been operated by the Oceanic in the San Francisco-Australasia run. This rumor, however, has not been confirmed by the Matson officials.

Three Liners for N. Y. K.

According to the latest reports from Tokyo, the three trans-Pacific liners for the Nippon Yusen Kaisha will be started within the next two or three months. The Japanese government agreed to subsidize the construction of first-class trans-Pacific liners to compete with those operated by the Dollar Line on the condition that the two large competing Japanese lines would consolidate. This consolidation was perfected on the first of May and the Japanese Diet has voted a shipping subsidy of 6,902,000 yen. The new steamers will be of 14,000 tons each and will be equipped with diesel engines and have a sea speed of 17 knots. The new ships will cost about $4,500,000 each and will be first class in every way.

San Pedro Chamber of Commerce has asked the City Council to authorize the construction of an additional fireboat for harbor protection.

U. S. Navy Yard, Bremerton, Washington, will shortly start alterations and repairs to the U. S. S. Maryland, which are estimated to be $300,000.

The U. S. S. Pittsburgh will report to the Brooklyn Navy Yard in June for overhauling, work to cost about $100,000.

The Navy Department has announced that work will shortly commence on the engines for the Chinese gunboats Nos. 43 to 48, contract for hull construction having been let to the Kiangnam Dock & Eng. Works, Shanghai. The engines are to built by the New York Navy Yard.

RECENT SHIPBUILDING CONTRACTS

American Brown-Boveri to Build Six Diesel-Electric Ferryboats. Announcement has just been made that the American Brown-Boveri Electric Corp., Camden, N. J., has received a contract from the Electric Ferries, Inc., New York, C. W. Winslow, President, for six diesel-electric vehicular ferryboats for operation between New York and New Jersey. This is a new firm and in addition to the ferryboats they plan the construction of four ferry terminals.

The boats will be 155 feet long, 48 feet beam, and 8 feet 6 inches draft. They will have accommodations for about fifty automobiles each. Two Nelseco diesel engines, built by the New London Ship & Engine Building Company, will develop 350 horsepower each and will be connected to Brown-Boveri generators of about 500 horsepower, sufficient to give the boats a speed of 13 miles an hour. They will have pilot house control.

J. C. Johnson's Shipyard, Port Blakely, Wn., has an order for a mail, freight, and passenger boat for the Coastwise Transportation Co., Juneau, Alaska. The boat will be 90 feet between perpendiculars, 22 ft. beam, and 15 ft. 6 in. draft, and will be powered with 200 horsepower Atlas-Imperial diesel engines. Keel was laid on April 24.

Bethlehem Shipbuilding Corp., Union Plant, San Francisco, has a contract from the Associated Oil Company, 79 New Montgomery Street, San Francisco, for a oil tank barge for San Francisco Bay and tributary river delivery service. The barge will be direct diesel drive, 116 over-all, 38 ft. beam, 9 ft. 6 in. draft, with capacity of approximately 4000 bbls. of oil. The diesel engines are to be of 110 horsepower each built by the Union Gas Engine Company of Oakland, Calif.

Los Angeles Shipbuilding & Drydock Corp., San Pedro, Calif., has an order from the Associated Oil Company of San Francisco, for a 7000-bbls.' capacity tow barge for Los Angeles harbor deliveries.

American Bridge Co., Pittsburg, Pa., has an order for six steel barges and two fueling scows for the Barrett Line of Cincinnati.

Bethlehem Shipbuilding Corp., Fore River Plant, Quincy, Mass. has an order for a ferryboat for Jamestown & Newport Ferryboat Co., 126 between perpendiculars, 48 beam, and 14 depth; also four carfloats for the New York-New Hampshire & Hartford Railroad.

(Continued on Page 284)

MORSE DRY-DOCK HAS BUSY SEASON

THE Morse Dry Dock & Repair Co. reports that the first quarter of 1926 saw a substantial amount of work pass through its 40-acre plant.

During January the steamship Minnewaska of the Atlantic Transport Line was on the large No. 2 Morse dock for several days. Considerable heavy weather damage forced this large British vessel to undergo repairs in an American yard. On account of its large dry-docking facilities, the Morse company has been fortunate in securing considerable work from the large English companies, whose usual practice is to have all possible repairs effected in home yards. The Cunarder Franconia and the Arabic of the White Star Line also visited this yard for extensive repairs.

The Florida land boom has had a direct beneficial influence on shipyard activities on the Atlantic Coast. Considerable neglected tonnage has been brought out to be reconditioned for the Florida run. One of these ships is the steamship Mascotte, now being fitted out by Morse. Included in the re-

(Continued on Page 286)

Hoisting 150 horsepower Fairbanks-Morse diesel engine preparatory to installation in tug John Morrissey at Morse yard last March.

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Bethlehem Shipbuilding Corp., Harlan Plant, Wilmington, Del., has an order for a carfloat for the So. Railway Co.

Bethlehem Shipbuilding Corp., Baltimore Dry Dock, has a new order for a carfloat for the Western Maryland Railroad and a carfloat for So. Railway Co.

Dravo Contracting Co., Pittsburg, Pa., has an order for a diesel engined towboat for Wheeling Steel Corp., Wheeling, Pa.; a sand dipper for the Rogers Sand Co.; 2 steel barges for Pittsburg Plate Glass Co.; order for 20 small steel barges for the U. S. Engineers, St. Louis.

Dubuque Boat & Boiler Works is building two steel dump scows for the U. S. Engineers, Louisville, Ky.

Federal Shipbuilding & Drydock Co., Kearny, N. J. has an order for a passenger and freight steamer for the Southern Pacific Steamship Lines, A. C. Hebble, superintending engineer, Pier 49, North River, New York. Boat is to be 429 between perpendiculars, 60 beam, 25 ft. 6 in. loaded draft, 6700 tons deadweight. She is to have De Laval steam turbines developing 7700 shaft horsepower. Steam is to be supplied by four Babcock & Wilcox boilers of 21,900 square feet heating surface and 16,000 square feet superheating surface.

Nashville Bridge Co., is building two new dredges.

Awards Diesel Installation Contracts.

Emergency Fleet Corporation, Department of Maintenance and Repair, 45 Broadway, New York, has made the following awards of contracts for installation of diesel engines in selected Shipping Board freighters.

Newport News Shipbuilding & Drydock Company on a total bid of $707,000 will install engines manufactured by Worthington Pump & Machinery Corp. in the freighters Tampa and Unicoi, of 5948 gross tons.

Newport News Shipbuilding & Drydock Company also received contract on a total bid of $768,900 for installation of engines manufactured by the Busch-Sulzer Bros. Diesel Engine Co., in the freighters Sawokla and City of Rayville, of 6000 gross tons each.

Bethlehem Shipbuilding Corp., Sparrows Point Plant, on a total bid of $815,000 has contract for installation of McIntosh & Seymour diesel engines in the freighters West Honaker and West Cusseta of 5376 gross tons.

KEEL LAYINGS

Margnita, passenger and freight boat for Coastwise Transportation Co., Juneau, Alaska, by J. C. Johnson's Shipyard, Port Blakely, Wn., Apr. 24.

Two double-ended ferryboats for Key System Transit Co., San Francisco, by Moore Dry Dock Co., Oakland, May 3.

Suction dredge for U. S. Engineers, by American Brown-Boveri Electric Corp., Apr. 4; carfloats for N. Y. Central Railroad in Apr. and May.

Two ferryboats for City of Boston by Bethlehem Shipbuilding Corp., Quincy, Mass., Apr. 13.

Carfloat for Long Island R. R. Co., by Bethlehem Shipbuilding Corp., Wilmington, Del., Apr. 15.

Auto and passenger ferryboat for International Transit Co., Sault Ste. Marie, Ont., by Collingwood Shipbuilding Co., Apr. 13.

Dump scow for Great Lakes Dredge & Dock Co., Chicago, by Great Lakes Engineering Works, River Rouge, Mich., Mar. 15; floating dock for Ford Motor Co., Apr. 15.

Maneuver hull for Vicksburg Engineers by Howard Shipyards & Dock Co., Apr. 17.

Robadcr, diesel engine yacht for Robert Law, Jr., by Newport News Shipbuilding & Drydock Co., Apr. 15.

Tugboat for New York Central R. R. by Staten Island Shipbuilding Co., Apr. 8.

Steel barge for Kelly Axe & Tool Co., by Chas. Ward Engineering Works, Mar. 14.

LAUNCHINGS

Golden State, diesel-electric ferryboat for Golden Gate Ferry Co., San Francisco, by General Engineering and Drydock Co., Alameda, May 2.

Palmetto, diesel ferryboat for Cooper River Ferry Commission, Charleston, S. C., by Charleston Dry Dock & Machinery Co., Apr. 13.

Two steel dredge hulls for Hains-

WM. CORNFOOT, President GEO. RODGERS, Sec'y-Treas.

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In Atlantic Coast *Shipyards*

Ship Repairing — Ship Building — Reconditioning — Engine Repairing

port Mining & Trans. Co., by Wm. Cramp & Sons Ship & Engine Building Co., Apr. 27 and 29.

Charleston, diesel ferry for Tri-State Ferry Co., Cairo, Ill., by Howard Shipyards & Dock Co., Apr. 29.

DELIVERIES

A. T. B. Co. No. 26, scow, by J. C. Johnson's Shipyard, Port Blakely, Wn., Apr. 14; C. L. Co. No. XLVIII., scow, Apr. 27.

Ten Barges for Carnegie Steel Co. by American Bridge Co.

Gulfcrest, diesel tanker to Gulf Refining Co., by American Brown-Boveri Electric Corp., Apr. 15; dredge hull for American Dredge Co., Apr. 29.

Col. James Pickands and Samuel Mather, bulk freighters to Pickands, Mather & Co. by American Ship Building Co., Apr. 12 and 17.

Hydraulic dredge to Sanford & Brooks by Charleston Dry Dock & Machinery Co., Apr. 1.

Steel Electrician, diesel-electric freighter to U. S. Steel Corp. by Federal Shipbuilding & Drydock Co., May 1.

Burnett, diesel-electric towboat to U. S. Engineers by Nashville Bridge Co., Apr. 29; towboat hull, Apr. 20.

Carfloat to Chesapeake & Ohio Railway by Newport News Shipbuilding & Drydock Co., Apr. 10.

Two steel barges to Kelly Axe & Tool Co. by Chas. Ward Engineering Works, Mar. 6 and Apr. 17.

REPAIRS.

Moore Dry Dock Company, Oakland, Calif., has completed repairs and renewals to the U. S. Army transport Somme at a cost of $60,000.

This company also received contract on May 1 on a bid of $27,980 and 12 days for damage repairs to the Associaed Oil tanker Frank G. Drum, which was in collision with the Shell barge Martinez. The only other bid was by Bethlehem, $29,460 and 13 days. Nine plates of the bow will have to be renewed and sixteen plates faired, in addition of minor repairs.

In the collision the oil barge Martinez was sunk in comparatively shallow water in San Francisco Bay and one man drowned. Bids were taken by the Shell Oil Company for raising the vessel. They were: $36,000 by the Red Stack Tug Co.; $40,000 by Merritt, Chapman & Scott; $80,000 by Haviside Co.; and $43,000 by Smith-Rice Co. Contract was awarded to the Red Stack Tug Company, who are now engaged in efforts to raise the barge.

* * *

Victoria Machinery Depot Co., Victoria, B. C., has contract for damage repairs to the Canadian Pacific freighter Princess Ena, which recently went on a reef at the entrance of Esperanza Inlet. Cost will be $25,000.

* * *

Moore Drydock Company also recently received contract for repairs to the U. S. Army transport Cambrai on a bid of $26,228. Other yards submitted bids as follows: Smith Machinery Co., $36,305; United Engineering Company, $33,918; Bethlehem Shipbuilding Corp., $30,519; General Engineering & Drydock Co., $28,805; Mare Island Navy Yard, $27,195.

* * *

Winslow Marine Railway & Shipbuilding Co., Seattle, was early in May awarded contract for fire damage repairs to the engine room and superstructure of the tug Creole of the Cary-Davis Tug & Barge Co. on a bid of $19,997.75 and 29 days.

* * *

General Engineering & Drydock Company, Alameda, Calif., recently converted to an oil burner the lumber vessel C. D. Johnson, III, ex-Lake Superior. This is one of the five lake-type vessels recently purchased from the Shipping Board by C. D. Johnson Lumber Company. The work cost about $80,000. The steamer Coriales another of this group will also be converted from coal to oil burner.

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CURRENT SHIPBUILDING NEWS

CONTRACT FOR SCOUT CRUISER STILL PENDING.

The Navy Department, Bureau of Construction and Repair, Washington, D. C., is holding up the award of contract for the construction of engines and hull of the scout cruiser Salt Lake City and engines for the Pensacola. Legal difficulties are reported as the cause. William Cramp & Sons Ship & Engine Building Company was low bidder for the entire job. Secretary Wilbur's problem is to determine whether this bid is responsive to the department's invitation. For the first time in advertising for bids, the department separated the hull and engine contracts in order to give engine building companies which do not also build ships a chance at the propelling machinery. The proposals made no specific provision for a lump sum bid on the whole job, and the secretary and his advisors have been unable to determine whether the Cramp bid is a competitive one in a legal sense.

It is announced at the office of Chairman T. V. O'Connor of the Shipping Board that the chairman will shortly present to the board a resolution to offer 200 steel vessels from the laid up fleet for sale for scrap.

STEAMER CHATHAM COMPLETES SUCCESSFUL TRIALS.

The Chatham, the first of the three palatial new coastwise steamers building for The Merchants and Miners Transportation Company of Baltimore by the Newport News Shipbuilding and Dry Dock Company successfully completed her trials off the Virginia Capes May 8.

The Chatham is 362 feet long, 52 feet beam, 3000 horsepower quadruple expansion engines, and has a sea speed of 14 knots. She is specially built for the Southern service. A number of the rooms have private baths and all have showers, electric fans, and large windows. Those on the upper decks have large windows and special screened doors to permit further ventilation. She is most attractively decorated throughout, and in addition tc a social hall has a large dance hall and sun-parlor. Accommodations are provided for 302 first-class passengers and 12 steerage.

The vessel is provided with every

aid for safe and efficient navigation including among other things a Sperry high intensity searchlight, engine speed indicator, Gyro-Compass with bearing position, steering position, and course recorder, and a self-synchronous helm angle indicator.

The Chatham will enter her regular service on the Boston-Baltimore run the middle of June. Her sister-ship, the Dorchester, will be completed and ready to join the fleet about the middle of July, and the Fairfax will follow a month later.

EQUIPMENT FOR MALOLO.

Some recent orders for equipment for the steamship Malolo building at the plant of Wm Cramp & Sons Ship & Engine Building Company, Philadelphia, for the Matson Navigation Company, include contract for the storage batteries and control switchboards, for the emergency lighting and interior communication systems, which was awarded to the Electric Storage Battery Co., of Philadelphia.

The Malolo will be equipped also with with Bonded floors supplied supplied by the Bonded Floors Company. These are resilient floorings of cork or cork composition and are made in many patterns and colorings suitable for various interior decorative schemes.

Erickson & Klepp Shipyard, Rainier, Oregon, is building a new marine ways to be 24 feet wide and a 150 foot cradle. The ways will have a caterpillar roller system operated by a donkey engine.

The San Pedro Marine Engine Works has announced a program of general enlargement and a reincorporation effective June 1, when the concern will be known as Parke and Kibele, Inc. The new company is incorporated for $100,000 and will add new equipment to enable it to handle any kind of a marine job except those entailing the dry-docking of vessels. The plant will also be equipped to handle general repair and machine work.

The officers of the new concern are William M. Parke, president; J. Donald Gunn, vice-president; Franklin P. Fletcher, secretary and treasurer; and O. B. Kibele director and general manager.

BALLARD MARINE RAILWAY COMPANY COMPLETES JOB.

A 40-foot diesel engined tug was launched May 7 at the yard of the Ballard Marine Railway Company, Seattle, for R. E. Richardson of Honolulu, and named the Kaauapali. The new tug is a small edition of the tug Mahoe which was built by the Ballard Company last year for Young Brothers of Honolulu.

The Kaapuapali is 40 feet long, 12 feet beam, and 6 feet molded depth. She is powered with a 60-horsepower Fairbanks-Morse CO engine.

Another interesting job just completed by these builders is the patrol boat Seal for the U. S. Bureau of Biological Survey, 69 feet long, 16 feet beam, and 10 feet 3 inches molded depth. New jobs on the ways include four cannery tenders for the Sunny Point Packing Company, Seattle; one cannery tender for the Skinner & Eddy Corporation, Seattle; and a 42-foot halibut schooner for Captain Marcus Ottness of Ballard, which is to be equipped with a Bolinder engine ordered from Sweden; and two scows for Foss Company, Seattle.

CURRENT AMERICAN SHIPBUILDING.

On May 1, 1926, American shipyards were building or under contract to build forprivate shipowners 196 steel vessels of 213,046 gross tons compared with 213 steel vessels of 213,052 gross tons on April 1, 1925, according to the Bureau of Navigation, Department of Commerce. There were 40 wood vessels of 15,859 gross tons building or under contract to build for private shipowners during the same period compared with 42 wood vessels of 14,654 gross tons on April 1, 1926.

MORSE DRY-DOCK HAS BUSY SEASON

(Continued from Page 282)

pair work is the installation of Morse fuel oil system, including tanks. At the same time her boilers and main engines are undergoing extensive overhauling. Work is progressing rapidly on this boat which, when completed, will take its place among the many Morse-conditioned vessels that this yard has turned out.

To the Morse yard goes the distinction of drydocking for the first time the new Italian liner Conte Biancamano of the Lloyd Sabaudo. This New York yard regularly docks the other crack liners of the Sabaudo fleet, the Conte Rosso and Conte Verde. Both the Conte Rosso and Conte Biancamano were docked during March.

Several years ago the Morse Company instituted a new branch of repair service known as the Morse Diesel Engineering Department. Even at that time it was forseen that diesel repairs could be most efficiently handled by separating them from the general run of engine repairs. As a result, they are today handling the bulk of diesel repairs in New York harbor. Repair figures on diesel work have been inclined to be excessive due to the unfamiliarity of the repair yards with the many types of diesels. Morse bids have been running low due to elimination of guesswork as a result of careful diesel study and cooperation with engine builders.

Besides several diesel repair jobs, the Morse Dry Dock & Repair Company is making a complete diesel installation in a new tug for Captain Morrissey of New York. Construction and installation of oil tanks is included in the work. The boat will be fitted with a Fairbanks-Morse Co. 150-horsepower CO engine.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Richlube, hull 5328, diesel-electric self-propelied barge for Richfield Oil Co., 180′ 6″ L.B.P.; 32′ molded beam; 12′ molded draft. Atlas-Imperial diesel engs.; Westinghouse motors, capacity 7000 bbls. oil; keel Jan Jan. 9/26; launched Mar. 15/26; **delivered May 12/26.**

GENERAL ENGINEERING AND DRY-DOCK CO.,

Alameda, Calif.

Golden State, hull 1, double-ended diesel-electric ferryboat for Golden Gate Ferry Co.; 240′ over-all; 44′ molded bam; 17′ molded dpth; Pacific Werkspoor diesel engs.; G.-E generators; keel Dec. 14/25; **launched May 2/26.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.,

San Pedro, Calif.

No name, hull 50, cabin cruiser for Don Lee; 140′ O.A.; 23′ 6″ beam; 9′ depth; 12.5 knots speed; 242 DWT.; diesel engs.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

A. T. B. Co. No. 26, hull 69, scow 110x36x8′ 8″, keel Mar. 24/26; **launched and delivered Apr. 14/26**

C. L. Co. No. XLVIII., hull 70, scow, 110x36x8′ 8″, keel Mar. 29/26; **launched and delivered Apr. 27/26.**

D. L. Co. No. XLIX., hull 71, scow, 110x36x8′ 8″; keel Apr. 15/26; launch and deliver May 3/26 est.

Margnita, hull 74, mail, freight, and passenger boat for Coastwise Transportation Co., Juneau, Alaska; 90 L.B.P.; 22 beam; 15′6″ draft; 200 H.P. diesel engs. **keel Apr. 24/26;** deliver June 24/26 est.

LAKE WASHINGTON SHIPYARDS

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Yacht for Frank Manz, 56′ long, 14′ beam; 6′ draft; 100 I.H.P. Hall-Scott eng.

Yacht for Wm. Trimshaw, 50′ long; 100 H.P. Eastern Std. eng.

MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

No name, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; **keel May 3/26;** launch Oct. 1/26 est.; deliver Dec. 1/26 est

No name, hull 171, sister to above; **keel May 3/26;** launch Oct. 15/26 est.; deliver Dec. 15/26 est

Hull 169, steel carfloat for Atchison, Topeka & Santa Fe R.R.; 260′ long; 38′ beam; 7′ draft; 620 D.W.T.; keel Apr. 1/26; launch Aug. 15/26, est.; deliver Aug. 31/26 est.

NAVY YARD

Puget Sound

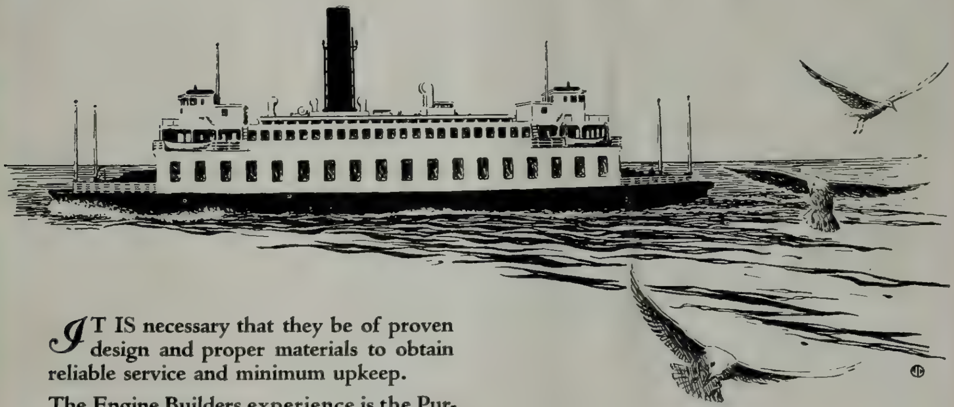
Holland, sumbarine tender for government; 460 LBP; 61 beam; about 20 loaded draft; 16 K loaded speed: turbine eng. 7000 IHP; two WT express type boilers; 10,000 tons disp.; keel Apr. 11/21; launched Apr. 16/26; deliver June 1/26 est.

Pacific Marine Review

The National Magazine of Shipping

JULY, 1926

Diesel Engines provide ideal power for ferryboats



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ST. LOUIS, MO.
San Francisco Office, RIALTO BLDG.

Official Organ
PACIFIC AMERICAN

Official Organ
SHIPOWNERS' ASSOCIATION

Pacific Marine Review, Vol. 23, No. 7, Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

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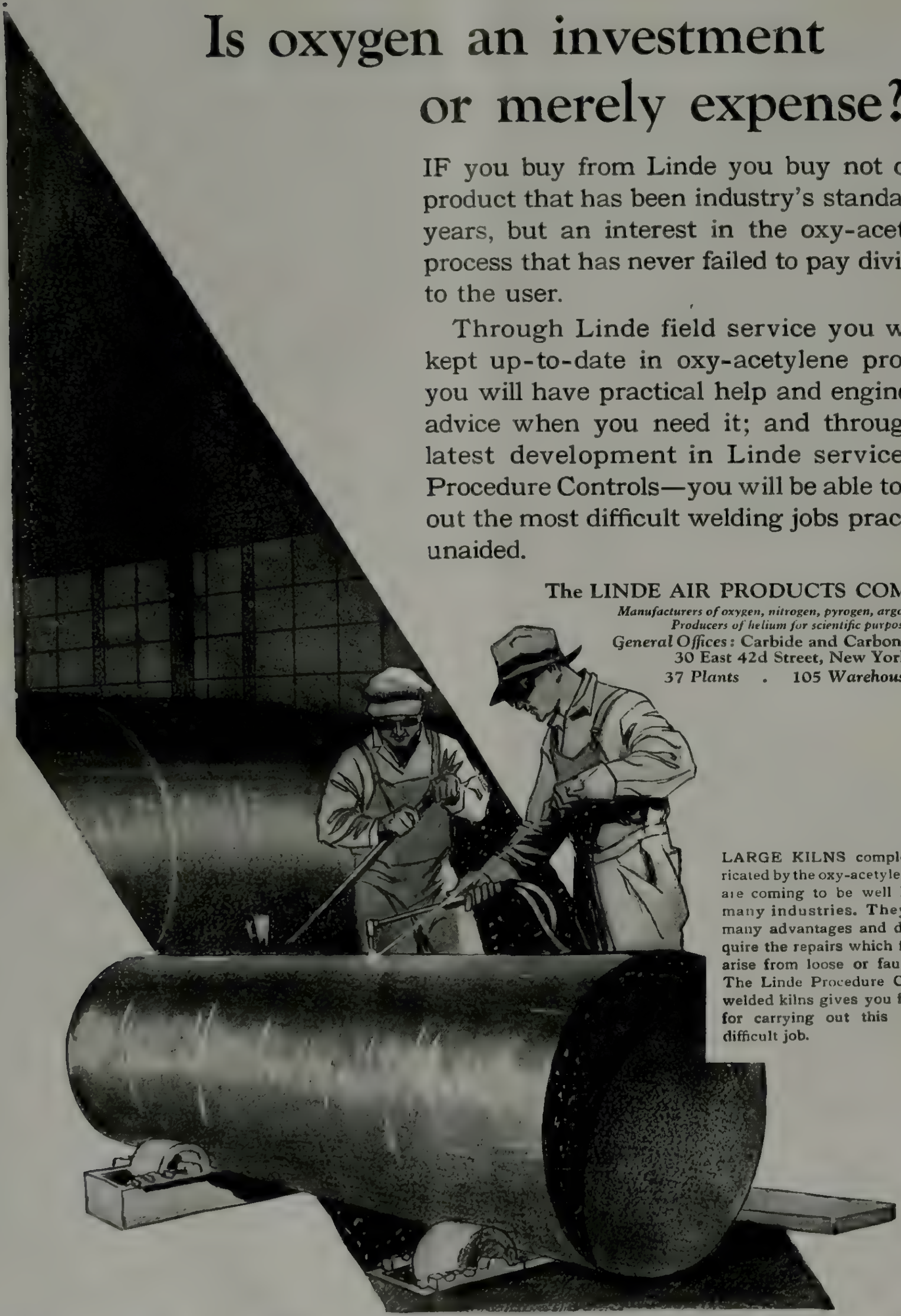

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Pacific Marine Review

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Anderson Tow Boat Company
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Kadiak Fisheries Company
Seattle, Washington
2 Engines.

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Vancouver, B.C.
14 Engines.

Gulf of Georgia Towing Co.
Vancouver, B.C.
2 Engines

Jas. Griffiths
Seattle, Washington
2 Engines

Mrs. Adamson
Los Angeles, California
2 Engines.

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Vancouver, B.C.

Alaska Consolidated Canning Company
Saginaw Bay, Alaska

Vancouver Tug Boat Company
Vancouver, B.C.

Iver Sellerite
Seattle, Washington

Pettersen, Anderson, Selfjord,
Seattle, Washington

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Seattle, Washington

Fred Sorensen
Seattle, Washington

Astoria & Puget Sound Can. Company
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"WASHINGTON ESTEP" DIESEL ENGINES

JULY 1926 Vol. XXIII. No. 7

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Official Organ
Shipowners' Association of the Pacific

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S. Hines. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Sesquicentennial

IN this year 150 of our national existence, it is well that all citizens take stock both of the national corporation and of their personal establishment. One hundred and fifty years is not a long period in the life of a nation; but if it be true, as the poet sings, "Better fifty years of Europe than a cycle of Cathay," then surely a sesquicentennial of America ought to be better than a millennium passed under "old world" conditions.

The progress of our merchant marine and of our foreign trade, usually hidden from American eyes by the greater glamour of developments ashore, has nevertheless been and still is a great source of wonder to other maritime nations. Just as there have been periods and phases of our progress ashore that we would like to forget; so in the conduct of our affairs afloat we have made many mistakes and suffered much injury thereby.

During our life there has come about a great fundamental change in the nature and purpose of overseas trading. In 1776 foreign trade overseas dealt almost exclusively in luxuries. Today the merchant marine fleets of the world are simply a link in a great complex system of world wide transportation which makes possible the interchange of any product produced anywhere for cash or for equivalent in any market however distant from point of origin.

In the good old days when seafaring was at the wind's will and sea trading was an adventure, Yankee youths as skippers astonished the world with their ingenuity and skill in driving ships, and their ready wit in driving bargains. What of their successors today? Apparently thep are still astonishing the world. In much current literature they are accused of astonishing the world by their "arrogance," their "failure to get the other fellow's viewpoint," their "inability to appreciate language," and of many other objectionable attributes affecting harmfully their contact with other nationals. Much of this criticism is due not to the bona fide foreign trader or ship's officer, but to the great stream of American tourists who lord it over all "furriners."

Scattered over the world today, and increasing daily in numbers, are found skirmish lines of the very finest of American young men. Salesmen of American foreign trading companies, scientists on work for American research foundations, representatives of the American Departments of State, Commerce, and Agriculture, University exchange professors, American students in foreign universities, representatives of American banks, American engineers, American missionaries, and American doctors; all spreading with amazing effiiency and hearty goodwill the use of American goods, American foods, and American machinery.

This contact steadily pressed with constantly increasing volume, has resulted in tremendous gains.

In 1821, first year of Federal records, the waterborne foreign commerce of the United States totaled under 128 million dollars. In 1925 it reached a little under 8 billion dollars. In 1821 any enterprise in America looking for capital usually found it in Europe. Today any foreign enterprise looking for capital usually makes an effort to sell a large part of its securities in the American money market.

We of the United States of America are "sitting on top of the world" today "just getting along." We have nothing to fear from foes without. But in our stock taking we must take pause "lest we forget" that we cannot thrive on any monopoly of world trade, for in that trade our chief competitors are our best customers.

So let us mark up as chief among our assets that heritage of vision from the fathers whose pilgrim feet with "stern impassioned stress, a thoroughfare for freedom beat across the wilderness" and whose keels ploughed furrows wide and free into every port oe'r every sea.

The Emergency Fleet Corporation

PACIFIC MARINE REVIEW has frequently directed reader attention to the reason for the Emergency Fleet Corporation. This body was created for the purpose of owning and operating ships. Its original constitution was drafted by William Denman of San Francisco, a competent proctor in admiralty and then chairman of the first United States Shipping Board. This constitution provides that the United States Shipping Board control the Corporation by holding ownership of 51 per cent of the stock. It expressly provides that the Corporation is liable under law in the same manner as any other corporation and with the same remedies.

Any just claims arising out of services rendered to the Emergency Fleet Corporation should be handled in precisely the same manner as would similar claims against any public service corporation. It probably will take longer to collect, but the claim should be kept alive and ultimately will be settled.

The Fleet Corporation has from time to time attempted in one way and another to evade responsibility by assuming itself to be a federal government department. In every such case, however, when brought to bar it has been summarily ousted from its false position by court decisions.

One of the latest instances is the decision of the Court of Appeals of the District of Columbia, handed down June 1, 1926, in which that court affirmed an award made by the Supreme Court of the District to the Western Union Telegraph Company in the sum of $1407.59, with interest, representing the difference between the government rate and the commercial rate on messages transmitted by the telegraph company for the Emergency Fleet Corporation during June and July 1922.

We are advising the pressing of all just claims against the Emergency Fleet Corporation, not because of any desire to see the Corporation financially embarrassed, but because we would like to see the Corporation show the way to make a net profit on the operation of American ships in foreign trade when operating under all the expense handicaps to which privately owned American ships in the same trade are subjected.

Shipping Legislation

ON another page of this issue, Captain W. J. Petersen, representing at Washington the Pacific American Steamship Owners' Association, tells of his impressions concerning the marine legislation attempted by the Sixty-ninth Congress. Striking a balance on the work of this Congress, it would seem that while the bills sponsored by the shipbuilders and the shipowners failed of passage, nevertheless we have much to be thankful for in that it was possible to have eliminated from many of the measures that did pass various items which would have been very harmful to the commercial success of the American merchant marine.

It must be evident to anyone who studies the contact of the merchant marine on Congress that there has been very little progress made in arriving at any understanding. We have before us a print of the full proceedings and testimony of hearings held by a Congressional Committee of the Forty-first Congress, who in the year 1868 traveled the ports of the middle Atlantic and New England States, holding hearings inquiring into the causes of "the decadence of our foreign commerce." These gentlemen had before them, in extended testimony, the most noted shipowners and shipbuilders of the ports of Philadelphia, New York, Boston, and Portland, Maine. Some very interesting and authoritive information was gathered together emanating from the minds of such men as Donald McKay, W. H. Webb of New York, the two most famous of America's clipper shipbuilders, and John Roach, father of American steel shipbuilding and at that time president of the Morgan Iron Works, New York.

Much of the testimony recorded will be found practically verbatim reappearing from American shipbuilders and American shipowners at the hearings held by the committees of the Sixty-fourth, Sixty-sixth, and Sixty-eighth Congresses. It is not surprising, therefore, that the same conclusions should be reached and the same legislation proposed in 1926 as in 1868; namely, a rebate to the shipowner or to shipbuilder to be paid out of the federal treasury equal to the tariffs that would have been collected if materials going into construction of these ships built for foreign trade had been imported. We are still waiting for the passage of some such directly beneficial legislation that will extend the policy of protective tariff to American ships in the foreign trades.

Shipping Board Appointments

WE predict that Jefferson Meyers, new commissioner on the United States Shipping Board, will make a good record. We do not know anything about the gentleman; but we notice that every press story concerning his appointment refers to Mr. Meyers only as a former state treasurer of Oregon and as a Democrat.

Since the choice of a Shipping Board Commissioner from the Northwest has been in the lime light for a considerable time, we take it that this paucity of details regarding Mr. Meyers' record is indicative of a very clean slate in political experiences of the gentleman in question and also of a considerable amount of reticence and control in his personal character—all of which is very much to the good in a commissioner on the Shipping Board.

We congratulate Mr. Coolidge on his reappointment of Chairman O'Connor. We do not agree with Mr. O'Connor on many points; but we are very willing to admit that taken by and large he has made the most outstanding success as a chairman of the United States Shipping Board of any of the many worthies who have occupied that position. Chairman O'Connor's public

Industrial Miniatures

Our illustration shows a model made in four sections depicting with great fidelity to detail the various processes and plants of the Richfield Oil Company, California. On the left is seen a typical oil well field; next to it a large refinery; then a harbor bunkering station; and at the extreme right a typical Richfield service station with a model of an automobile racing speedway at the rear. This model was built by Good Brothers of Pasadena.

utterances have been very forceful and commendable, brief and usually calculated to stiffen the spinal column and increase the fortitude of the American ship-operator.

Good Business

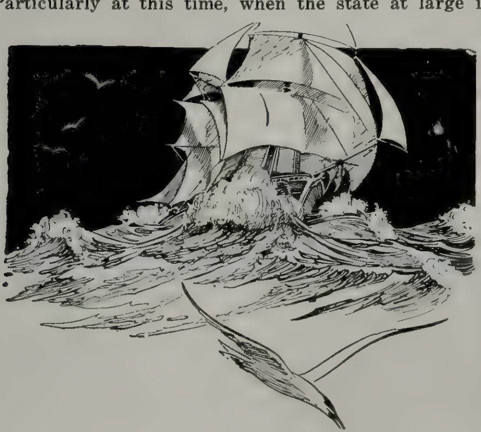
SOME time ago the engineering department of the Board of State Harbor Commissioners, who control the port of San Francisco, planned a large pier and terminal for the improvement of the south end of the present waterfront, just south of Channel Street. The estimated cost of this pier, including the cost of floating bonds and of interest while under construction, was $1,900,000. The pier was planned to be a solid fill 1200 feet long and 600 feet wide, which will make it the largest pier on the San Francisco waterfront.

At the time of the original planning of this pier there was in hand in the improvement fund of the San Francisco harbor about $500,000, and there were planned and necessary improvements which it was intended should be made from this fund to an amount at least equal to their total fund. In the three years that have elapsed since the original proposal of these plans, it has been found possible to carry on all necessary maintenance work, make the improvements and additions required, and lay by enough additional surplus to show a fund of $1,700,000, after paying for these necessary improvements.

The state board has therefore asked and been granted permission to use this surplus for building the new large pier, thereby saving $150,000 of expense that would have been necessary in floating bonds.

This is merely another instance of the efficient administration and economical management for which the Board of State Harbor Commissioners operating the port of San Francisco have become noted during the last twenty-five years. This plan of using surplus funds instead of authorized bonds should place the state board in a very strong financial position to, at any time, take care of any emergencies that may arise. The bonds are authorized and are applicable at any future date on any necessary waterfront improvements.

Indirectly this sort of good business administration is of immense benefit to other state improvements. Particularly at this time, when the state at large is issuing bonds in large amounts for educational buildings and for road purposes, it is very beneficial to have two million dollars of anticipated bond issue withdrawn leaving a clearer market for the balance.



"Family Baggage?"

SHORTLY after our semi-centennial, that part of Mexico now known as the State of Texas became a free and independent Republic with a civil government all set, a standing army, an (also largely standing) navy, and all other accoutrements of modern civilized commonwealths, including that elusive source of revenue, customs duties.

In a recent issue of "World Ports," the excellent monthly magazine published by the American Association of Port Authorities, is published a series of letters written as reports to the Secretary of the Treasury by Gail Borden, Jr., then Collector of the Port of Galveston.

The following, bearing date of August 2, 1837, shows the proper attitude of the faithful public servant in circumventing the wiles of individuals avoiding responsibility to said public.

"On the manifest of schooner Helen, Delarm Master, from New Orleans, was found the following articles, shipped by and consigned to George Stephens, and marked "G. Stephens", which he, (Mr. Stephens) did not report in the entry which he made of other articles on the 25th July:

"One box sausages, twelve trunks clothing, eighteen boxes furniture, eight window sashes, five bundles bedding, two bedsteads and one table, one organ, one hogshead and two barrels furniture, two boxes furniture, five boxes preserves.

"On yesterday I ascertained that the above goods and articles belonged to Mr. Huston, who presented a baggage entry containing the above articles (or most of them). This being inadmissible, I told Mr. Huston that, judging from the character of the goods, I should require him to make an impost entry as well as one for baggage, for I have good grounds to believe that 'twelve trunks clothing and eighteen boxes furniture' contained more than belonged to a family baggage.

"The inspector is now on board and examining such packages as Mr. Huston claims as baggage, which, if found to contain nothing dutiable, will be permitted. The residue I shall order to public store for examination * * *

"Many of the packages contain part of a museum of wax figures, etc., and many of the clothes belonging to the same.

"My opinion is that the wax figures and museum are subject to an ad valorem duty of 25 per cent. The clothing to 30 per cent. It may be said the articles are old and not worth much—if so the duties will be proportionately small. These clothes were attempted to be passed as wearing apparel, but the law contemplates the raiment for flesh and blood, and not the habiliments of wood and straw. In this case as in all others, I have extended as many favours and facilities as the law permitted, but so far as I know my duty I shall pursue it, regardless of momentary clamours of interested persons."

Congress and The Merchant Marine

Brief Statement of the Present Situation of Maritime Legislation at Washington

By Captain W. J. Petersen.

POSSIBLY at no session of Congress has there been such vicious legislation attempted by marine labor union leaders to embarrass the American merchant marine as has been attempted during the present session. So far not one piece of this legislation has been successful and it is very unlikely that any of the pending bills will pass both houses of Congress.

Our success has been attained by the active and intelligent cooperation given by shipping interests on the Pacific Coast from Seattle to San Diego. Fortunately, for the American merchant marine of our country the Pacific Coast has been united, and aided to a large degree by our Pacific Coast representatives in Congress we have steadily worked together to block the passage of bills, that had they passed would have most seriously jeopardized the efficient operation of the merchant marine.

Commencing with the so called immigration and deportation bills every effort was made to insert into these bills provisions that would have deprived us of the use of a marine personnel necessary to operate our vessels, particularly the coastwise service on both coasts. The result of our efforts has been to have a bill reported and passed by the House that if the Senate can be induced to agree to it, will provide the means to deport undesirable aliens without unduly harassing American shipping.

A number of bills have been introduced in both houses to provide compensation for marine workers who are not now protected under state compensation acts. While the marine interests on both coasts agree to the great necessity of providing compensation for maritime employees, yet the bills introduced at the instance of marine labor unions provide rates and compensation provisions higher than any now provided by state compensation acts. Also it has been our desire to provide compensation for seamen. These labor unions, backed by many representatives who come from coastwise cities and who hope to secure their support in the coming fall elections, oppose compensation for seamen and are quite willing to place the tremendous financial burden on maritime concerns regardless of the equity of the matter. Two bills have been introduced, one from the Senate known as the Cummings bill that was passed out of the Senate Judiciary Committee, and the same evening under suspension of the rules was passed by the Senate without giving any opportunity to the maritime employers to be heard.

Another bill known as the Graham Bill has been passed out by the House Judiciary Committee. This is generally unopposed by marine operators although its rates are altogether too high and is now waiting for a rule by the Committee on Rules so that the bill might be heard on the floor of the House. Both these bills, Senate and House, are greatly different in administration, fees, compensation and scope of operation, and it is our hope that the bills may not pass until we may have an opportunity to either amend them or introduce a new bill that may in some measure at least be agreeable to all concerned.

A few days ago, the King Bill, also framed by marine labor unions, was passed out of the Senate Immigration Committee. This bill would prohibit an American or a foreign ship from entering any harbor except in distress if a Chinese or Japanese or any other national unadmissable to citizenship because of national status was on board the vessel, while it would permit a Chinese or Japanese vessel to come in loaded with their nationals. This bill also provides other iniquitous features, and if passed would give Chinese and Japanese vessels a great advantage over other foreign and American ships in the foreign trade. This bill was fought with energy during the hearings, but because of the active effort of Senator King of Utah was reported out of committee.

The King Bill will, because of the great possibility of international complications, be opposed by foreign legations in Washington. The provisions of the King Bill were successfully opposed by us in the House Immigration Committee and were not given place in the Holiday Deportation Bill that was passed by the House a few days ago. So there is little likelihood of this bill ever becoming a law.

The La Follette Bill, also sponsored by marine labor unions, so far has not been reported out of the Senate Committee of Commerce. This bill has been contested in every point by our associations here, and I believe with success. This bill would prohibit the right of a seaman to receive his government discharge, permit the violation of ships agreement between the ship and the personnel, require the signing on and off the crew in coastwise service, and prohibit the signing of the crew unless the vessel was fast to the dock by gangway. Other bad features appear in this bill that has had the most active support of the marine union leaders of both coasts.

These bills, I believe, cannot be passed by this session at least, because not only are they actively opposed by maritime organizations all over the country, but because Congress will shortly adjourn before they can be heard and passed by both houses.

We were able to very materially assist in the Coast Guard Cutter Bill that had the endorsement of our Pacific Coast Associations and the bill was signed by the President recently. This bill will give us at least four new cutters on the Pacific Coast and it is hoped that these four may be built by Pacific Coast shipyards.

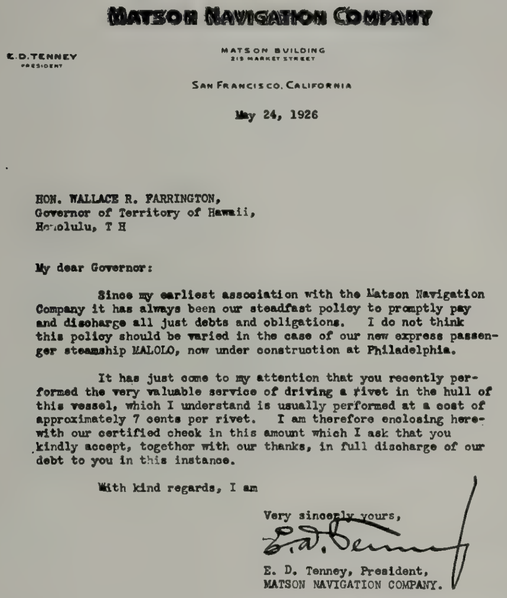
The shipping interests have a number of bills prepared that will materially assist our merchant marine if we can get them passed in the future, but will not be heard during this session although they have been referred to appropriate committees and are ready for action in the next session.

I have noticed a most commendable desire on the part of our national representatives to learn something about our merchant marine. Just now the lack of information in their possession does not speak well for our shipping interests, who for years have permitted a lot of biased, untruthful and vicious propaganda to be passed out without challenge by those who have only personal ambitions to serve and who have tried in every way possible to disrupt, retard, and demoralize American shipping. That American shipping interests are now alive to this condition of affairs has been evidenced by their activity during the present session of Congress. Our nation is not ship minded.

SAN FRANCISCO
PUBLIC LIBRARY

Congress practically knows nothing of this great industry. What information they have received has caused a tendency on their part to get a wrong understanding of shipping conditions and to lean toward the side that has the strongest political battallions. Consequently, much vicious and unwise legislation is passed to the great detriment of American shipping.

Our Pacific Coast has paved the way to a better understanding, and it is hoped ere long that east and west, gulf and Great Lakes will unite in one central body that will educate the country at large and the members of our national legislature to the needs of our merchant marine, for such necessary legislation as will enable us to successfully compete with foreign maritime nations, and to make that great national arm in peace and war effective and competent to carry out its manifest destiny.



MATSON NAVIGATION COMPANY

E. D. TENNEY
PRESIDENT

MATSON BUILDING
215 MARKET STREET

SAN FRANCISCO, CALIFORNIA

May 24, 1926

HON. WALLACE R. FARRINGTON,
Governor of Territory of Hawaii,
Honolulu, T H

My dear Governor:

Since my earliest association with the Matson Navigation Company it has always been our steadfast policy to promptly pay and discharge all just debts and obligations. I do not think this policy should be varied in the case of our new express passenger steamship MALOLO, now under construction at Philadelphia.

It has just come to my attention that you recently performed the very valuable service of driving a rivet in the hull of this vessel, which I understand is usually performed at a cost of approximately 7 cents per rivet. I am therefore enclosing herewith our certified check in this amount which I ask that you kindly accept, togethor with our thanks, in full discharge of our debt to you in this instance.

With kind regards, I am

Very sincerely yours,

E. D. Tenney

E. D. Tenney, President,
MATSON NAVIGATION COMPANY.

A Poor Investment

THE Emergency Fleet Corporation has sent out to shipbuilders specifications and plans for the reconditioning of the Mount Vernon and for the reconditioning and repair of the America. The latter, it will be recalled, was damaged very extensively by fire at Newport News when the original reconditioning job was well on the way to completion.

We are always glad to see any work going into American shipyards, and money spent on such work is always put into wide circulation for the benefit of large numbers of people. However, the money spent and about to be spent on these two vessels would, it seems to us, be in a much better investment position if spent on new tonnage.

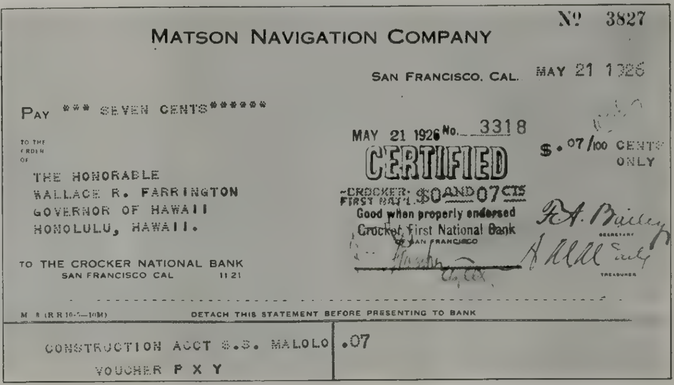
The Mount Vernon and the America, formerly the Kronprincessan Cecile and the Amerika, are both over twenty years old. They are both coal burners and the expensive reconditioning job will leave them as coal burners. The Mount Vernon will have 75 firemen and 64 coal passers in her crew. Both are low pressure Scotch boiler, reciprocating plants, "the steam plant of the last century."

With all the great shipowners of the world conspiring to scrap their tonnage of twenty years old and upward, why should the most powerful and most prosperous nation in the world turn the cold shoulder to the pleas of her best advisers, refuse to appropriate funds for building new and up-to-date passenger vessels for transoceanic service, and then spend millions in dolling up two out of date tubs, neither one of which can ever possibly pay its way in that service.

If private capital were asking Uncle Sam for a mail subsidy, does anyone think that two such makeshifts as the Mount Vernon and the America would be considered by our Uncle as suitable for ocean greyhounds, auxiliary cruisers, first-class passenger liners to which, with his chest thrown out and his thumbs in his "waistcoat pockets," he could pridefully call the attention of his cousin John Bull? Wise up on plant investment, Uncle, and perhaps some of the red will disappear from your marine balance sheet.

The Laborer is Worthy of His Hire

We reproduce herewith an interesting letter and check mailed by E. D. Tenney, president of the Matson Navigation Company, to Wallace R. Farrington, governor of Hawaii. The documents are self-explanatory, and form a rather unique exhibit for the office of the governor. No doubt the "Flying Fish" will feel more free to fly in the consciousness that all just debts and obligations have been fairly met.



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MATSON NAVIGATION COMPANY

SAN FRANCISCO, CAL. MAY 21 1926

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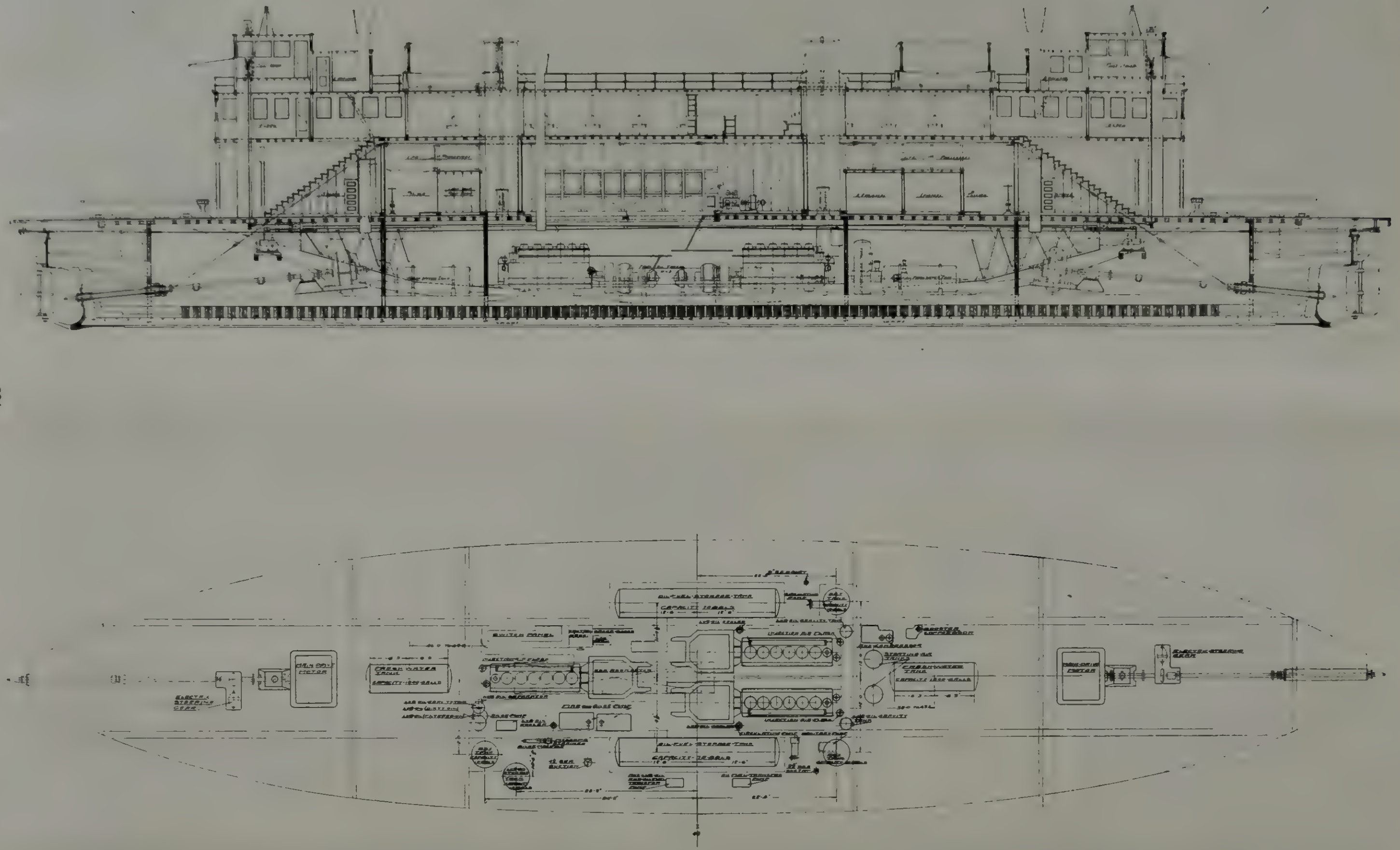
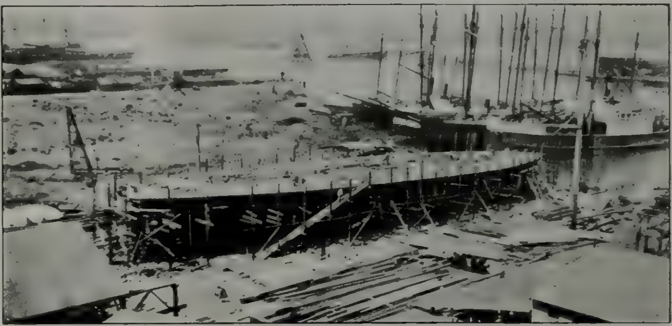
New Diesel-Electric Ferryboat Golden State



Inboard profile and hold plan of diesel-electric ferryboat Golden State recently completed by the General Engineering & Drydock Company of San Francisco for the San Francisco-Sausalito run of the Golden Gate Ferry Company.

Diesel-Electric Ferryboat Golden State

Fine New Vehicular Ferryboat Completed by the General Engineering & Drydock Company for the San Francisco—Sausalito Service of the Golden Gate Ferry Company



The hull of the Golden State on the ways at the Alameda Yard of the General Engineering & Drydock Company.

As we go to press this month the General Engineering & Drydock Company of San Francisco is running the official trial trip of the new diesel-electric ferryboat Golden State, built at their Alameda yard for the Golden Gate Ferry Company of San Francisco. This company pioneered this type of ferryboat propulsion with their first San Francisco-Sausalito ferry Golden Gate, which was put into service July 4, 1922 and has been in operation continuously since that date. Golden Gate was followed promptly by Golden West, and now comes the larger and improved Golden State which is to be promptly followed by two sister ferries.

The Golden State is of the following general dimensions:

Length over-all	240′0″
Beam, molded at deck	44′0″
Beam, over guards	60′0″
Depth, molded	17′0″
Speed, light	13.5 knots
Speed, loaded	13 knots

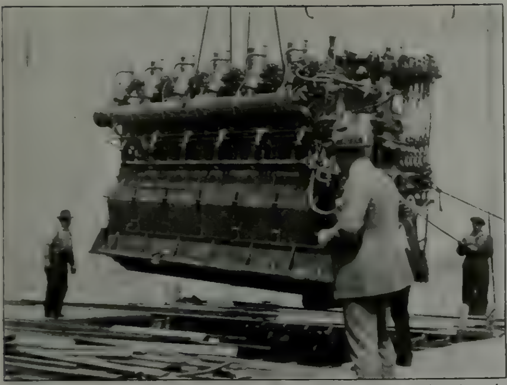
As will be noted from the inboard profile and hold plan reproduced herewith, this ferryboat is built of wood. All of the structural members are of Douglas fir with the following exceptions—the shoe which is of white oak and the propeller posts and guards which are of iron bark. An exclusively Pacific Coast timber, Douglas fir lends itself admirably to ship building on three counts—its great structural strength, its ability to produce long large dimension timbers free from checks and knots, and its comparatively low price. Note on the inboard profile the lengths of keel timbers—only three scarphs in the entire length of vessel.

The Golden Gate Ferry Company will operate this Golden State between San Francisco and Sausalito, on a route that is mainly concerned with the transfer of passenger automobiles and trucks. The Golden State is therefore designed to have the main deck as free as possible from structural members so as to stow the maximum of wheeled vehicles. The hull and main deck compose a unit structure which is stiffened by two longitudinal structural iron trusses in the form of an inverted arch, the top and bottom chords of which are heavy Douglas fir timbers. These trusses are continuous throughout the hold, from the collision bulkhead at one end to that at the other, and, in conjunction with the sturdy structural members of the hull, form a stiff adequate foundation calculated to distribute and absorb all stresses due to propulsion, to loading, and to floatation.

The Power Plant.

The power generating plant is located amidships and consists of three 400-horsepower, 6-cylinder Pacific diesel engines, each directly connected to a 270 kilowatt, direct-current, General Electric generator and a 30-kilowatt direct-current, compound wound exciter. The arrangement of these units and of the auxiliaries is plainly shown in the hold plan herewith. Current from the three generators is supplied directly to the two main propelling motors, each of which is capable of developing 950 horsepower. These motors are of General Electric make, direct current, shunt wound, independently excited type and are provided with water-tight hoods. Control of these motors is of the Ward-Leonard type and is arranged so that it may be exercised from either

The Golden State nearing completion at the outfitting dock of the General Engineering & Drydock Company, Alameda, California.



400-horsepower Pacific diesel engine being lowered through texas deck into the engine room of the Golden State.

pilot house or from the main engine room control stand. In operation the motor at the after end of the ferryboat is driven full power, full speed, and the motor at the forward end is turned over just fast enough to eliminate frictional slip. Operating thus the motors alternate on the load and both get occasional momentary peaks in maneuvering into the slip. This system has functioned 100 per cent on the ferryboats Golden Gate and Golden West for four years and shows very fine records for fuel economy.

The propelling motors are fitted with Kingsbury thrust bearings. Line and tail shafts are of forged steel 5⅝ inches diameter, and tail shaft is fitted with Goodrich rubber bearings. The propeller is three-bladed, 8 feet diameter, 8 feet 10 inches pitch.

To insure an adequate supply of maneuvering and injection air, a Rix duplex 6 by 3 by 6-inch air compressor, driven by a General Electric marine type 15-horsepower motor, is installed in the compartment adjacent to the engine room. This compressor will deliver 40 cubic feet of air per minute at 350 pounds pressure. It is arranged for cross connection either to the starting air tanks or to a Rix auxiliary booster No. 1. This machine, driven by a 5-horsepower General Electric motor, will deliver 7 cubic feet of air per minute at 1000 pounds pressure. This compressor and booster are duplicates of those installed on the ferries Golden Gate and Golden West, the repeat order being due to the excellent service record of this equipment.

A fire pump is installed driven by a 40-horsepower General Electric motor and capable of delivering 400 gallons of water per minute against a head of 100 pounds per square inch. Northern rotary pumps, electrically driven, handle the sanitary system and the transfer system for lubricating and fuel oils. For auxiliary and emergency lighting and power there is installed on the main deck a 25-kilowatt Sterling gasoline engine electric generating set, a duplicate of those whose service has given such great satisfaction on the Golden West and Golden Gate.

The balanced type rudders are operated by independent Cunningham electric steering gears.

The Superstructure.

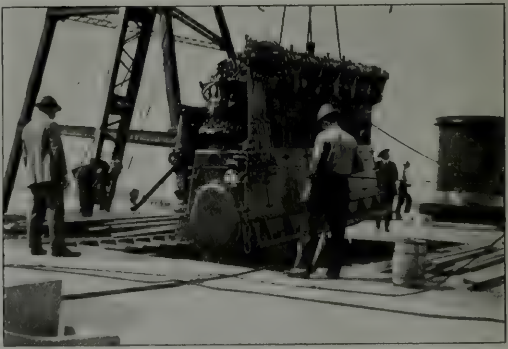
On the hull or float heretofore described is erected a house of two decks, the saloon and the texas decks. The saloon deck is of sufficient height above the main deck platform to give 12 feet 6 inches clearance for vehicles, which is ample for all ordinary truckloads. On the saloon deck is arranged a cabin with comfortable seating accommodations for 350 persons; a restaurant with seating capacity for 75 and with adequate galley and pantry equipment and in addition beautifully fitted and furnished rest rooms and lavatories for women and for men. The plumbing fixtures are of the well known Standard Sanitary ware. All the piping in sanitary system is of brass.

On the texas deck are erected two pilot houses with sleeping quarters for four men attached to each pilot house. The only projections above the texas deck are the two false stacks. These function as ventilation ducts for the engine room and as housings for the three 6-inch Maxim silencers. Their low squat lines add materially to the pleasing effect of the silhouette of the boat.

The General Engineering & Drydock Company, working under difficulties, has made a very good record in the building of this hull, and from present indications it would seem that two more are to be built at this yard in the near future. Millions of automobiles cross San Francisco Bay every month, and traffic load is getting heavier at a very rapid rate. It will be years before a bridge can be built in any location that will serve the need, and experts agree that before such a bridge can be completed the traffic will be heavy enough to take care of the ferries and many bridges.

Much credit is due the Golden Gate Ferry Company for their foresight and enterprise in pioneering a new type of ferry propulsion, and we are glad to record that the experiment has been a decided commercial success. In fact, this success has been so marked since the first year of operation that older and more conservative firms are following the lead, and diesel electric propulsion is becoming almost a standard power plant for this type of vessel. No other type yet developed gives as speedy dispatch and as flexible control at as low a cost as does the diesel-electric type.

The building program now contemplated on San Francisco Bay calls for seven new vehicular ferryboats equipped with twenty-six diesel engine generating sets and fourteen propulsion motors. Five of these boats will be of steel construction and two of wood. We note in this connection that New York has followed our lead and is building a number of similar type ferryboats. We predict again as we did six years back in the pages of Pacific Marine Review that the diesel-electric drive will prove the best drive for this class of service.



Pacific Diesel No. 2 being lowered into place through texas deck of Golden State. Note false stack at right of illustration.

McIntosh & Seymour Diesels

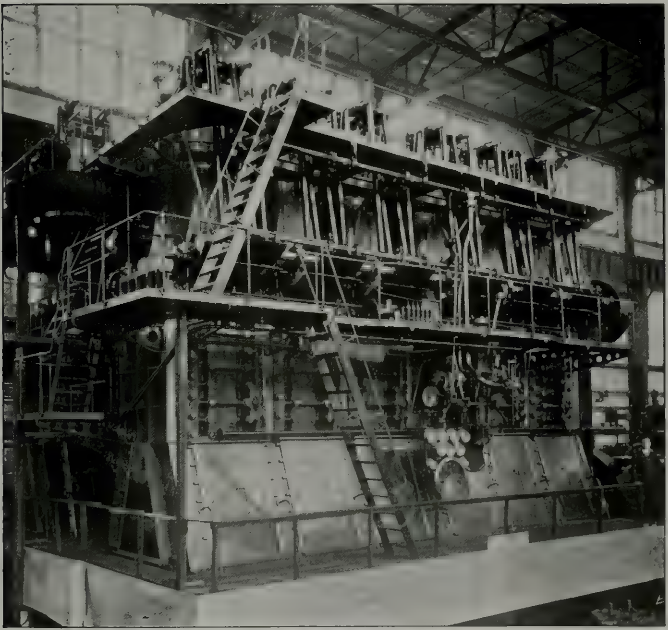
Successful Tests on Thirty-Day Nonstop Run for Shipping Board Conversion Program

THE McIntosh & Seymour Corporation has completed the second of the three 4-cycle, single-acting, 3000-horsepower diesel engines for the Shipping Board. The fourth unit for the Shipping Board, on order with this company, is a double-acting diesel engine of approximately the same horsepower. The results of the tests on the single-acting units may be of interest.

To bring out any inherent defects, the Shipping Board required a 30-day non-stop test run of the first unit. While such a run does not offer anything extraordinary in the operation of a diesel engine, for diesel engines both on land and sea often make non-stop runs greatly exceeding the duration of this test, there were peculiar difficulties connected with this particular test which must be understood to properly rate the results obtained.

The characteristics of the main engines are as follows:

Indicated horsepower	3260
Nominal brake horsepower	2700
Number of cylinders	6
Bore, inches	32
Stroke, inches	60
Revolutions per minute	95
Weight, pounds	800,000
Total approximate height, feet	32
Total length, feet	40
Total width, feet	11½
Weight of largest casting, pounds	65,000



The McIntosh & Seymour 3000-horsepower, 6-cylinder, marine type diesel engine on the test stand at Auburn, New York.

The above unit has six power cylinders and the injection air is supplied by an independent air compressor unit; hence there is no air compressor integral with the main engine. Under normal operating conditions this independent air compressor would be installed directly alongside the main unit and the injection air pipe connecting the two units would be relatively short. Due to the conditions in the test shop it was necessary to place this compressor unit more than one hundred feet from the main engine, which caused a drop in pressure of the injection air of over 80 pounds.

This independent compressor has a normal brake horsepower of 400, a speed of 200 revolutions per minute, has 4 cylinders, 17 inch bore by 24 inch stroke. It also drives a 75-kilowatt generator, the current from which will be used for driving the ship's auxiliaries.

An added difficulty of this test was the fuel used, which was a very poor grade, at times containing as high as 4½ per cent sulphur and a B. T. U. content of 17,000. These characteristics, together with a low Baume and high viscosity, made it necessary to preheat this fuel to permit it flowing through the pipes.

The test run was conducted in February and the main supply of fuel was located 1500 feet from the testing shop. This oil flowed through pipes for this distance above ground and at times it was difficult to secure an adequate supply of fuel. The supply of cooling water ran at 35 degrees Fahrenheit throughout the test. This made necessary a relatively small amount of cooling water to secure high enough temperatures and meant a wide range of temperatures in the engine.

Notwithstanding these handicaps the 30-day run average fuel consumption checked up at 0.409 pound per brake horsepower for all purposes.

The main outline of this engine does not depart from the characteristics of McIntosh & Seymour design, well known to both marine and stationary users of diesel engines in the United States. This design was developed with severe marine duty in mind. Cast steel A frames, joining the rigid bed plate and the cylinder blocks, are connected by crosshead guide plates into a practically rigid box girder giving that integral stiffness and ability to maintain alignment which is so necessary in a marine prime mover.

A special feature of this engine is the maneuvering gear, which is extremely simple. Two levers control the entire maneuvering of the engine. One controls the supply of air to rams, which reverse the engine by removing the rollers from their cams, moving the camshaft endwise and replacing the rollers on the astern cams. The other lever

(Continued on Page 307)

The Physical Aspects of a Vessel

By Norman F. Titus, Manager, Claims-Insurance,
McCormick Steamship Company.

THE shipping business is highly technical and with innumerable ramifications. The searchlight of attention is altogether too frequently focused upon traffic and the more obvious question of operation. As a result, one of the most important aspects of the business is generally neglected by the student; that is, a consideration of the strength, carrying capacity, stability, buoyancy, stresses, and strains; in other words, the sea qualities of the vessel. Many a good ship and, what is infinitely worse, many precious lives have been lost through want of a proper understanding of the capabilities and behavior of the vessel when she braved the elements upon putting to sea. No understanding of the shipping business is complete without a thorough grasp of the principles of what might be termed the physics of the ship. Very briefly, the main points of this subject are set forth as follows:

Displacement: Commencing with this subject we find the term physics quite accurate, for the principles involved are mainly those enunciated in hydrostatics.

Any body floating in a liquid displaces a volume of the liquid such that the weight of the liquid displaced equals the weight of the floating body. Displacement, in the technical sense as applied to ships, or other floating bodies, refers to the displacement of the water as indicated by the above law. The quantity of water displaced, expressed as a rule, in cubic feet, is called the volume of displacement, and the corresponding weight displaced is termed the weight of displacement and is usually given in tons. A cubic foot of sea water weighs 64 pounds, or 35 cubic feet weighs one ton—thus expressions of weight or volume are readily interchangeable.

The practical application of this principle is highly important, not only to the naval architect, but also to the steamship company's operating department. Obviously, it is necessary to know the increasing draught of the vessel as more and more cargo is stowed aboard. It is interesting to know just how this is worked out.

If a body were of uniform dimensions like a box it would be a simple matter to determine displacement, by multiplying the length, breadth, and immersion, thus ascertaining the volume of immersion, and then by multiplying this by 64, get the pounds displacement. Due to the curvature of the model of ships this method of computation is impossible. However, the principle underlying the calculation of displacement is the same. Any simple rule that will accomplish this is manifestly of great value, for if it were attempted to ascertain the weight of the ships by estimating the weight of every component part—hull, engines, boilers, masts, etc.,—the problem would be exceedingly difficult and the result open to inaccuracy.

The rules for accomplishing this result are known as "Simpson's Rules" and are in reality mathematical formulae for determining the areas of bodies bounded by curved lines. They do not give scientifically accurate results, but they approximate so closely to the exact results that they answer perfectly for all practical purposes.

Simpson's First Rule Take a form similar to half a ship's deck; that is, a form with a straight base line corresponding to the center line of the ship and with upper edge corresponding to the curvature of the ship's side. Divide the base into an even number of equal parts. Through the points of division and at the extremities draw ordinates to the curve perpendicular to the base, and measure their lengths. These ordinates will be odd in number.

Rule: Multiply the length of each of the even ordinates by four and each of the odd ordinates by two, excepting the first and last, which multiply by one. The sum of the products multiplied by one-third of the common interval between the ordinates will give the required area.

Calculation of Ships Displacement: Divide the immersed depth of the vessel into equal intervals by waterplanes parallel to the load waterplane, and for greater accuracy subdivide the lowest interval. The area of each of the waterplanes can then be calculated by Simpson's First Rule. Next the cross section is averaged up by the Simpson's Multipliers in the same manner, using for the ordinates the areas of the waterplanes just mentioned and the product will be the displacement in cubic feet.

Displacement Curve: To make a separate calculation whenever the displacement is required at any particular draught would entail considerable labor and inconvenience. This is avoided by using what is termed a Displacement Curve, which is nothing more or less than a graphic representation of the factors—a vertical line indicating mean draughts and a horizontal one representing tons of displacement. A line running through the displacement at different waterlines gives the displacement curve. In practice, there is set to the right and opposite the displacement curve on ship's plans a table having four vertical columns giving direct readings for deadweight, draught, displacement, and free board.

Deadweight: The total weight of the ship at any draught is equal to the displacemtnt at that draught. Deadweight is carrying capacity only, over and above the actual weight of the ship and her equipment, and comprises cargo and bunker coal. The deadweight of a ship floating at a particular draught is the difference between the displacements at that draught and in the light condition.

Tons Per Inch Immersion: By tons per inch is meant the number of tons required to be put on board or to be taken out of a vessel to effect a difference of one inch in the mean draught. Thus the term "tons per inch" really means displacement per inch. It is found by caluculating the displacement for a foot of the depth at the particular draught at which the vessel is floating, and dividing this by twelve. The result is the increase or decrease of the displacement for one inch alteration in mean draught, commonly referred to as "tons per inch." For practical purposes this is generally determined graphically by a curve similar to the displacement curve. It is obvious that if the vessel were a box, the "tons per inch" would be the same at any draught. However, with a ship the curvature of the hull gives different results for each draught, hence an immersion curve is necessary.

Effect of Density of Water. Every seaman knows that when a vessel passes from salt to fresh water, the draught is increased; and a decrease is effected when passing from fresh to salt water. The reason for this is that salt and fresh water differ in density and, therefore, differ in their supporting qualities to bodies floating in them. One ton of fresh water measures 36 cubic feet, while a ton of salt water measures 35 cubic feet. Since the weight of the ship remains the same, the weight of the water displaced must remain the same also, thus it is that when changing from salt to fresh water the volume of displacement increases. The practical feature of this situation is illustrated in the matter of loading vessels at Portland, Oregon, in fresh water. Here they can be loaded three to five inches over their proper load-line, and then when they enter the ocean at Astoria they will rise to their proper marks.

There is another way of expressing this problem. A cubic foot of sea water weighs 64 pounds and a cubic foot of fresh water about 63 pounds; thus in fresh water at the same water line a vessel's displacement will be one sixty-fourth less than her displacement in salt water.

Coefficients of Displacement: In comparing the displacement or under water form of one vessel with another, it is not sufficient to say that one is long and the other short, one broad and the other narrow, one deep and the other shallow. A comprehensive means of expressing the comparison properly is to imagine the ship hewed out of a solid block and then to express in decimals the part which the displacement bears to the circumscribed rectangular block. The term used to distinguish this factor is the "block coefficient" of displacement. The way this works out can be illustrated by the following:

0.8 would be a very full vessel.

0.7 to 0.75 an average cargo steamer.

0.65 a moderately fine cargo steamer.

0.6 a fine steamer such as is used for passenger service.

0.5 an exceedingly fine steamer, but an average for steam yachts.

0.4 to 0.5 fine yachts.

Center of Gravity: Briefly stated without any scientific discussion, the point at which a body will balance in any position is called the center of gravity of that body. A ship, however, is a system of bodies and the point at which the system will balance is called the center of gravity of the ship.

A thorough understanding of the location of the center of gravity is important because its location, taken into consideration with the movements of weights, generally cargo, determine the "moments" or forces tending to right her or to capsize her when in an inclined position.

Effect on the Center of Gravity by the Moving of Weights: When weights in the hold are raised and placed on deck directly amidships, or when they are placed to one side of the ship, or when taken out of the vessel, they directly affect the location of the center of gravity. The amount it is displaced is easily determined by the simplest of calculations.

Buoyancy: When the enclosed water-tight volume of a ship, expressed in cubic feet, is greater than its total weight in tons multiplied by 35, it will float; otherwise it will not.

Water Pressure: Another element of physics is the effect of water pressure. Experiments show that while a floating body is subject to the same gravitation forces out of the water as in it, the downward pressure of its weight is balanced by an exactly equal upward pressure from the water itself. Furthermore, pressure varies directly as the depth of immersion, that is, twice the depth, twice the pressure. Again, pressure is exerted equally in all directions. The practical application of this last law is that while the upward pressure of the water tends to force the vessel out of the water, this is balanced by the weight of the ship and she floats. Nevertheless, on the other hand this same pressure exerts a crushing weight on the sides and great care must be exerted to overcome it by rigid design of the ship's structure.

Reserve Buoyancy: The buoyancy of the immersed portion of the vessel represents that which is requisite to keep her afloat. The buoyancy of all enclosed water-tight space above the waterline is, therefore, surplus buoyancy, or safety buoyancy, or, as it is more commonly termed—reserve buoyancy.

Sheer: A vessel which has just enough buoyancy to keep her afloat is not safe, for without reserve buoyancy every wave would submerge her deck. It is the surplus buoyancy that gives her rising power and provides righting power when inclined.

In the construction of vessels the bow and stern are generally elevated and it is this elevation of the ends above the line of the water-tight space above the waterline that is called sheer. As noted before, the water-tight space above the waterline is known as reserve buoyancy and the superstructure above that is termed sheer. The great practical advantage of sheer from the standpoint of physics is that every time the vessel pitches into a wave, the additional immersion causes a corresponding buoyant reaction and the vessel is thrown up again.

Great care must, therefore, be exercised with flush-decked ships with small sheer forward, for the vessel may so dip into the sea as to ship water in huge quantities, and if the vessel is not properly constructed she will founder.

The value of poops and forecastles, especially the latter, particularly if efficiently closed at the ends, will now be understood, as they greatly add to the reserve buoyancy at those parts of the vessel where it is specially valuable. All bridges with water-tight ends and other deck erections provide reserve buoyancy of more or less value.

Center of Buoyancy: In ship calculations it is necessary to determine this center of buoyancy, and formulae are available for this purpose. Furthermore, curves of center of buoyancy are generally plotted for determining its location at different draughts.

Effect of Entry of Water Upon Buoyancy: There are three cases of this kind:—

(a) If water enters the hold of a vessel from above: The result of water finding ingress in this way might be considered equivalent to the loading of cargo, the water being deadweight at the rate of 35 cubic feet to the ton. The only case in which she would founder would be when the total weight of the vessel, cargo and water in her, were more than the maximum possible displacement.

(b) If the plating is damaged and the sea rushes in and fills the compartment: Under these circumstances, as there is free communication between the water in the hold and the sea outside, the vessel has been robbed of the total buoyancy of this compartment, both actual and reserve. The vessel then has to call upon the reserve buoyancy of the other compartments and if the buoyancy of the other compartments, plus their reserves, is greater than the original buoyancy, then the vessel will float, otherwise she will founder.

(c) **Suppose the vessel has the damaged hold filled with cargo, say lumber:** The water will flow into the hold and occupy what space is available. This may be very small, since the hold is already practically full, as the water cannot occupy the space taken up by the lumber, the remaining space only can be occupied. Often this available space is very small and the resulting effect almost negligible. The proportion of the total space which could be filled with water is called permeability of the compartment.

Water-tight Doors and Freeing Ports: Two of the greatest controlling factors for water aboard are water-tight doors and freeing ports. The water-tight doors are of inestimable value in confining the size of the affected area, while freeing ports are indispensable for getting rid of the water shipped on deck.

Load, Stress, and Strain: Load is the weight causing a stress, whether it is the cargo or if the vessel is light, then it might be the machinery, fuel, water, stores, etc. Stress is the twist, pull, thrust, or shearing action of the load on the loaded part. Strain—the effect of stress—is to cause the parts under stress to yield or to alter in form. The amount of actual yielding is the strain.

These factors are of tremendous importance in ship operation because stresses and strains may permanently alter a ship's form and greatly impair her usefulness, if not destroy her value. Even in a ship at rest without cargo, the ends and the engine compartment have a downward shear on account of their great weight, while the sections embracing the holds have an upward shear depending upon the upward thrust of the water. The action of these forces causes a stress on the ship's framing. Likewise, great care must be exercised in stowing cargo to obtain equal distribution of weights, otherwise great damage will result.

Stresses at Sea: Great as the stress may be on a ship in still water, the stresses experienced at sea are still greater. Obviously, if a vessel is crossing seas head on or at an angle, when in the trough of the sea with the ends of the ship immersed in the waves, there will be an upward stress at the ends and a downward one at the center. Immediately thereafter when on the crest of a wave the stresses will be just reversed with an upward shear in the midships and downward at the relatively unsupported ends. Obviously, therefore, the vessel is constantly subjected to uneven stresses and strains through the very nature of her occupation; and consequently everything should be done in loading her to distribute the load so as not to increase the stresses in any way.

Stability: This is the moment of force (usually measured in foot-tons or in inch-tons) with which a vessel, when inclined from the upright position by the action of some external force, immediately endeavors to right herself. Many ships, especially of the older type, have not sufficient stability to stand upright when light and require to be ballasted before going to sea.

Metacenter: When a vessel is inclined from the upright, the center of gravity and center of buoyancy are no longer in a vertical line. The vertical line drawn through the center of buoyancy intersects the center line of the vessel at a point defined as the metacenter. When the metacentric point is above the center of gravity there is a positive lever of stability tending to right the vessel. When the metacentric point is below the center of gravity there is a negative lever tending to upset the vessel.

Stiff and Tender: When the metacentric height is positive and its numerical value is great—that is, where it is a considerable distance above the center of gravity—the righting moment, when the vessel is inclined, is great, and the vessel is said to be stiff. When there is very little metacentric height, and the vessel, therefore, possesses small righting leverage when slightly heeled, she is said to be crank or, as sailors more commonly say, tender.

Features of Design Influencing Metacentric Height: The two important features in the design of a ship influencing the height of the transverse metacenter are beam and displacement. The formulas disclose that vessels with good beam and fine form of underwater sections have the highest metacenter. Thus, there are two ways of obtaining stiffness—by placing heavy weights as low as possible and by increasing the beam.

Factors upon which Stability Depends: The three great factors upon which the stability of any floating body depends, whether it be of ship or box form, are beam, freeboard and position of center of gravity.

Rolling: The effect of metacentric height in relation to rolling is exactly the opposite to what might at first be imagined. The stiff ship offering great resistance to inclination is the one which generally rolls most violently in a seaway; and the tender vessel, with small resistance to heeling, is usually a steady ship.

Resistance to Rolling: There are a number of factors that enter into the proposition of resistance to rolling, but the one exerting the greatest influence is hanging keels, and especially bilge keels. Another method is available to assist in producing steadiness and that is to stow some of the heavy weights of the cargo in the wings or towards each side of the vessel. Such an arrangement of cargo will have a steadying effect upon the ship's motions. On the other hand, concentrating the weights in the middle line of the vessel tends to increase the rapidity of transverse rolling.

Purchasing for a Modern Shipyard

By Edw. C. Geehr, Manager, Purchases and Stores,
The Wm. Cramp & Sons Ship & Engine Building Co.

I CAN recall very vividly what a wonderful fascination boats had for me as a boy, and many a one have I whittled out of rough wood and launched on the Delaware. As a youth in school, this fascination continued, and I often found myself looking with great youthful imaginings at the fast growing hulls of the St. Paul and St. Louis at that time building at the yard of the Cramp Shipbuilding Company. These two ships were, in my opinion, as beautiful a pair of hulls as ever were turned out from a shipyard, and as I watched them grow and saw them launched and finally delivered to their owners to engage in transoceanic passenger traffic, I became obsessed with the desire to help in the building of such ships and associated myself with the Cramp Shipbuilding Company. I was not long in discovering that I had made no mistake in so doing, for I was surrounded by an organization of men who were, by heredity and long experience, practical shipbuilders. It is a fact today that in this yard there are three generations of more than one family in the employment of the company.

Anticipation and Cooperation.

As manager of purchases and stores, I have often been asked to describe the manner in which purchases and deliveries of materials are scheduled to meet the various stages of construction. There are many detailed methods by which this process is carried out in different yards; but in every case, in order to have any degree of smoothness in the working out of these processes, it is necessary that there be between the various departments of the yard and the department of purchases and stores a great degree of "Anticipation and Cooperation."

In the yard of The William Cramp & Sons Ship & Engine Building Company the two departments of purchases and stores have been consolidated for a considerable time and the consolidation seems to work out to advantage in effecting cooperation between the heads of the departments, the sub-foremen, and the manager of purchases and stores. Very close contact is kept between my office and all of the various departments of the yard in order that materials, upon receipt, can be properly located both with regard to their fabrication in the shops and with regard to their proximity to erection in the vessel. By this means the cost of handling and of probable damage is kept at a minimum.

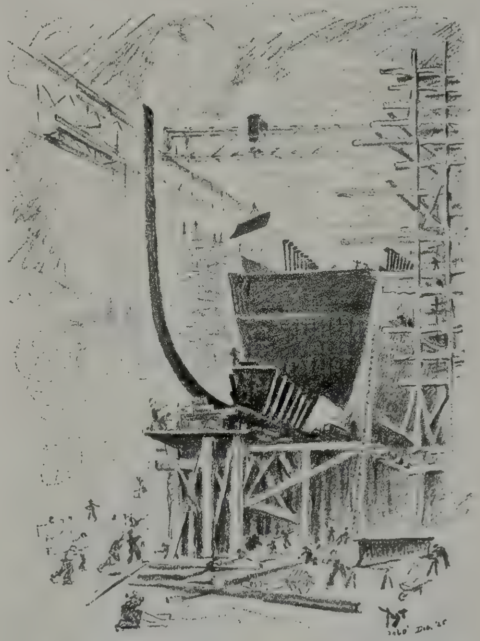
Specifications.

The construction of a large vessel, particularly of a large passenger vessel, requires the purchase and the fabrication of a very numerous and diverse list of articles and materials. In fact it may be said that there is compressed into the hull of such a vessel practically all of the requirements for modern life in a model up-to-date city of from 2500 to 3500 inhabitants. The requirements for such a vessel are first listed in specifications on which the shipbuilder must devote much study to fix a price at which he can build the vessel and make a profit. Frequently there is on hand in stock in a large shipyard a considerable amount of materials, of fittings, and of furnishings that can be used in such a vessel. The department of purchases and stores carries this stock on its books at a certain value and part of the work of that department is to cooperate with the estimating department, giving them data as a basis for a large part of the calculations of the contract price.

Requisitions.

When the contract has been let to the shipyard, the drafting rooms of the yard will immediately get to work upon the requisite drawings and requisition lists. These requisitions are handled through the department of purchases and stores and each of them requires the closest watching so that the part of the requisition which is to come from stock will be so made up and the part that is to be ordered will be obtained to the best advantage in the market. Through cooperation with the heads of the various departments and of the foremen, a schedule is worked up of dates on which the shipyard will need all of the principal units of hull materials, machinery, auxiliaries, and equipment. This schedule, if carefully followed, will result in this material being delivered from the cars into the hull promptly on arrival.

On the Malolo, one of the largest and finest passenger ships ever constructed in the United States, the many tons of materials and the great variety of articles arriving constantly at the yard are practically being disposed of from car to hull. This method of handling materials was successfully carried out in the Cramp yard during the late war and worked to great advantage in assisting the delivery on schedule time of 46



A sketch by Charles Johnson Post illustrating the stem of the Malolo erected on the ways of the Wm. Cramp & Sons Ship & Engine Building Co.

destroyers, 4 tankers, 2 freighters, and 3 transport vessels. It may be of interest to readers to list the order of procedure in the delivery of materials and items of equipment for a recent contract.

Synchronizing Deliveries.

First comes the structural material for the hull and the rivets. This material has to be routed through the plate shops so as to arrive at the hull ready for erection as needed. Practically at the same time the principal steel castings connected with the hull, such as the stem and stern posts, the spectacle frames and the struts, must be arranged for delivery from the forging plant so as to synchronize with the delivery of the fabricated plates and shapes. From this point the schedule is run approximately as follows:

Manholes and scuttles;
Sea valves and shell connections;
Fuel oil heating coils;
Drainage and air piping;
Scuppers and drains;
Fresh and salt water drainage piping;
Steam heating system;
Fire mains;
Fuel oil transfer system;
Ventilating system;
Plumbing to start on ship;
Galley and pantry outfit;
Water-tight doors;
Cargo ports and hatches;
Auxiliary machinery foundations;
Hawse pipes in yard;
Cargo booms and masts;
Bits and chocks in yard;
Steering gear in yard;
Carpenter and joiner decks to start on ship;
Rudder stock and frames;
Air ports (round);
Ship carpenter work to start on ship;
Joiner work to start on ship;
Skylights;
Elevators;
Deck machinery and piping;
Main and auxiliary steam piping;
Auxiliary machinery;
Condensers ready for ship;
Evaporating and distilling plant;
Refrigerating plant;
Engineers' workshop tools;
Boiler feed system;
Forced draft blowers and ducts;
Generators;
Electrical wiring, interior communication, telegraphs, etc., to start;
Thrust and steady bearings ready for installation;
Line shafting ready for installation;
Propellers;
Boilers ready for installation;
Uptakes and smoke pipes ready for installation;
Metal berths ready for installation;
Tiling to start;
Anchors and chains ready for installation;
Turbines ready for installation;
Reduction gears ready for installation;
Smokestack ready for installation;
Launching;
Lifeboats;
Beds for passengers;
Metal balusters and grille work;
Deck outfit ready for installation;
Navigating outfit;
Wireless Outfit;
Dock trial;
Upholstery and stateroom outfit;
Trial trip;
Delivery.

In building a ship, many items of this list are fabricated, manufactured, and finished, ready for installation on the vessel, in shops outside of the shipyard and sometimes far removed therefrom, and not directly under inspection or control of the shipbuilder. It therefore becomes necessary for the department of purchases and stores to very carefully anticipate the delivery dates of such items and cooperate with the manufacturers thereof in allowing proper time in which to make deliveries.

For myself, and for the organization in my department, it is a great pleasure to watch these schedules synchronize under careful handling and so to contribute our bit to the smooth and economical completion of that, in some senses, most beautiful and wonderful of man's creations—a great, vibrant steam or motor vessel.

THE MALOLO

Our illustration is taken from a picture by Gordon Grant showing the Malolo as she will appear when finished and entering Honolulu Harbor. The great "Flying Fish" will be 582 feet in length, 43 feet wide, and will have a displacement of over 22,000 tons on a draft of 28 feet 6 inches.

She will have the finest passenger accommodations ever built into an American vessel for 693 first-class passengers, as well as a cargo capacity considerably greater than that of the Majestic or the Leviathan.

The Malolo will be powered with Cramps-Parsons geared turbines developing 25,000 horsepower on twin screws; she will be capable of 23 knots sea speed, and her schedule of four and one-half days at sea between San Francisco and Honolulu calls for a steady speed of 21 knots. She is being built at The William Cramp & Sons Ship & Engine Building Co. for the San Francisco-Honolulu run of the Matson Navigation Company.

New Coastwise Liner for Morgan Line

THE Southern Pacific Steamship Lines have recently contracted with the Federal Shipbuilding & Dry Dock Co., Kearny, New Jersey, for the construction of a large freight and passenger steamer for the New York-New Orleans service. As designed, the vessel will be of the most modern and up-to-date type for Atlantic coastwise service. Passenger accommodations and public spaces will be commodious, well ventilated, and of special design and arrangement for this class of vessel.

The vessel will be of the following general dimensions:

Length over-all	445′0″
Length between perpendiculars	427′0″
Beam, molded	60′0″
Depth, molded to saloon deck	37′0″
Designed loaded draft	25′6″
Deadweight capacity, tons	6900
Cargo capacity, cubic feet	420,000

Power Plant.

The propelling machinery will consist of De Laval compound turbines with double reduction gears. These turbines will be designed for 7100 shaft horsepower at 85 revolutions of the propeller shaft. Boiler equipment will consist of four Babcock & Wilcox marine type water-tube boilers, built for a working pressure of 350 pounds and 200 degrees superheat and equipped to burn fuel oil. Boilers are arranged fore and aft with a center athwartship fire room and will be fitted with air heaters located at the base of the smoke stack. Both forced and induced draft will be fitted. Two 75 and one 25-kilowatt geared turbine generators will be installed.

The vessel's designed sea speed is 15¾ knots. She is arranged to handle cargo economically and expeditiously and is fitted with ten double cylinder steam cargo winches. The arrangement calls for six hatches and eight cargo ports on each side. The main steering gear is of the hydro-electric type, with an auxiliary steam steering gear of the right and left hand screw type. Steering gears will be controlled by wire rope transmission from the pilot house, in addition to a Sperry gyro pilot control, fitted with a Sperry helm angle indicator. A Sperry gyro master compass and repeaters will also be installed.

Passenger Accommodations.

Passenger accommodations will be provided for 279 first-class and 54 third-class passengers only. Crew personnel will include 24 in the deck department, 24 in the engine department, and 66 in the steward's department. All rooms for the first cabin passengers will be outside rooms to insure comfort and ventilation in warm weather. These will include suites with twin beds and ordinary rooms with single beds and Pullman upper berths and settee berths.

Hull Arrangement.

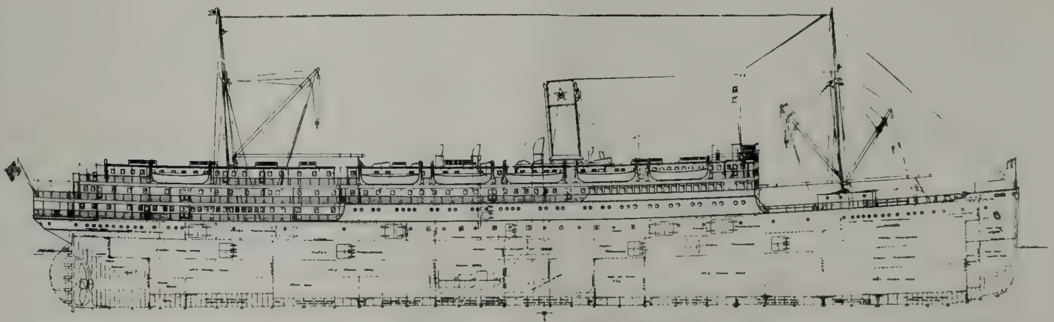
Of the hurricane deck type, with steel superstructure and with straight stem and semi-elliptical stern, the vessel will be rigged with two pole masts and will be fitted with one smoke stack. Three complete steel decks, fore and aft, a steel premenade deck, and an orlop deck in the forward hold will ensure ample strength and stiffness.

The superstructure will contain first cabin accommodations, music room and lounge, dining room, social hall, smoking room, observation sun parlor and dancing room, and barber shop.

Third class passengers will be accommodated forward on the main deck. Deck and engineer officers quarters, together with mess room and wireless room, will be located on the boat deck around the boiler casing and on the forward end; waiters and cooks on the main deck aft; and the firemen and oilers on the main deck amidships. The seamen will be berthed in a deckhouse forward on the saloon deck.

Public Rooms.

Arrangements and design of joiner work, upholstery, and draperies throughout the public spaces will differ materially from what is usually seen in vessels of this type. A large number of public and private bath rooms will be provided and will be fitted with the most modern type porcelain tubs and fittings. Shower baths will be fitted in all bath rooms. Running hot and cold, fresh and salt water will be supplied to suites, staterooms, officers' quarters and baths. Cooled drinking water will be circulated throughout the passengers' and crew's quarters. Public spaces, halls, and passageways will be heated by steam and the staterooms will be heated by Electro-Vapour radiators. Special attention has been given to ventilation of public spaces and passenger and crew's quarters. Electric fans will be fitted in all staterooms and bath rooms to cool these rooms while in southern waters. A complete telephone system is to be provided for all rooms and public spaces with call bell annunciators in the smoking room.



Outboard profile of new coastwise freight and passenger steamer being built at Federal Shipbuilding & Drydock Company, Kearny, New Jersey, for the Southern Pacific Steamship Lines.

Life Saving Equipment.

The vessel will be equipped with the most modern life-saving and wireless equipment. Lifeboat capacity will be provided sufficient to take care of all persons on board, including passengers and crew, one of the lifeboats being fitted with a motor.

Fire Prevention and Detection.

Particular attention has been given to fire-proofing the vessel and the passenger quarters in particular. Fire-proof Vehisote will be used throughout for the divisions, ceilings, and paneling, and steel fire screen bulkheads are to be fitted throughout the passenger accommodations and public rooms. All staterooms are to be provided with a complete Cory-Aero-Alarm fire detector system. In addition to the requirements of the United States Steamboat Inspection Service, a Rich smoke detector system will be installed throughout the cargo spaces and, in connection therewith, the Lux fire extinguishing system will be fitted. The Lux system will also be fitted in the engine and boiler rooms and the oil fuel tanks.

Protected Promenade.

The forward end of the superstructure on the promenade deck is to be enclosed with windows, which will add much to the comfort of the passengers in cold and stormy weather. The observation sun parlor will have a dance floor 20 by 26 feet, and the vessel will be provided with an electric player piano and an electrically operated phonograph. The finish throughout is to be of American Colonial type, designed exclusively for this ship. Every consideraton has been given to the safety and comfort of the traveling public.

The vessel has been designed by and will be built under the supervision of A. S. Hebble, superintending engineer of the Southern Pacific Steamship Lines, New York.

Diesel Motorship Versus Coal Steamer

ONE of the most interesting papers read before the spring meetings of the Institute of Naval Architects was that by J. W. Lovett dealing with "The Comparative Freight Economies of a Cargo Vessel with Reciprocating and with Diesel Machinery." This paper is an attempt, by comparative analysis, to arrive at the most economic conditions of trading for a cargo vessel of 8000 tons deadweight.

Comparisons are made in the results of a year's trading for such a vessel under the following divisions:

A—Total weight of cargo carried.

B—Annual expenditure.

C—Freight rates.

D—Profit and Loss.

In each division comparative analysis is made by superimposing various modifications as follows:

1—Fuel prices ranging from 15 shillings to 25 shillings per ton for coal and from 30 shillings to 70 shillings per ton for oil.

2—Voyage lengths ranging from 2000 to 8000 miles.

3—Speeds ranging from 8 to 11 knots an hour.

4—Three natural draft coal burning boilers and triple expansion engine to diesel engine with steam auxiliaries, 2400 indicated horsepower.

5—Loaded full both ways to loaded full one way only.

The analyses take into account full operating expenses, including depreciation, insurance, office expense, repairs, and stores, wages, harbor and canal dues, stevedoring, and fuel. Summarized, the conclusions reached are as follows:

(1) The tremendous cost of stevedoring for vessels on short voyages makes the design of the loading and discharging appliances and facilities of paramount importance.

(2) It would appear to pay large shipowning companies to carry some or all of their insurance.

(3) The equivalent proportionate costs of coal and oil are such that a change of 1 shilling in coal prices requires a change of about 3 shillings in oil prices, but low price of coal is of more value to the steamer owner than constant relationship between coal and oil prices.

(4) It costs very much less to run a vessel on long voyages than on short voyages.

(5) Within small limits an increase of speed is not costly as affecting transport rate.

(6) It is not much more costly to run a vessel with full cargoes out and home than with full cargoes home and ballast only outward.

(7) There is an economical speed for all lengths of voyages, and this is not necessarily the slowest speed. This speed is higher in the motorship than in the steamer.

(8) For very full vessels a reduction in the block coefficient will probably result in a cheapening of the cost of transport.

(9) The motorship is more economical than the steamer for long runs and higher speeds, and the economy is greater when full cargoes are not obtainable; but with coal available at 15 shillings per ton, the steamer is at present more economical than the motorship when trading on short runs from the United Kingdom.

(10) Under certain conditions of trading, when a vessel has to go out in ballast to get a homeward cargo, the tramp steamer, with coal bunkers full and with ballast tanks full, will be at a deeper draught and more seaworthy with empty holds than the diesel-engined vessel in similar circumstances. This might be a deciding factor of the design.

It would seem, in view of item (1) above, that these analyses would have been of greater practical value had they been made as comparing the reciprocating steam engine plant with a real diesel motorship equipped with diesel-electric auxiliaries.

However, the good old British devotees of steam think that the paper gives all the breaks to the diesel. In the discussion Sir John Biles pointed out that the steam plant used in the comparisons was the "steam plant of yesterday." He gave some interesting figures on the relative space occupied by various types of marine machinery as figured for a fast cross-channel steamer. Using water-tube boilers and turbines at 700 pounds pressure, 143 shaft horsepower per foot length of machinery space could be installed. The comparative figures work out as 125 shaft horsepower with low

(Continued on Page 307)

High Pressure Water-Tube Boilers for Marine Propulsion

By Harold B. Yarrow, C. B. E.

THE adoption of high pressures and high superheats in marine steam plants is creating a great deal of interest and discussion among marine engineers. This article by a great British authority is therefore very timely. It is abstracted from a paper read at the recent meeting of the Institute of Naval Architects.

The adoption of high pressures and temperatures on land has already made considerable progress, and just in the same way as the introduction of the steam turbine for marine purposes followed some years after its introduction on land, so it would appear that history is repeating itself in the case of high-pressure boilers. Boiler installations having steam pressures of 500 pounds to 600 pounds per square inch, and superheat temperatures of 700 degrees to 750 degrees Fahrenheit, are in commercial use in a number of power stations, and such pressures and temperatures may be said to have passed the experimental stage. If, therefore, these pressures and temperatures can be adopted on land, there seems no reason why they should not likewise be adopted at sea. There are certain fundamental factors common to both, among them suitable materials and workmanship. The better and more uniform materials now in use, and the improved metallurgical and manufacturing methods now adopted, remove from the designer's mind any anxiety as to materials. Copper, wrought iron, and cast iron have been discarded in the manufacture of water-tube boilers of high pressures. Steel is in common use, and its uniformity leaves little to be desired. Certain of the non-ferrous alloys which are now used also contribute to that security which characterizes modern installations. Workmanship must obviously be of the very highest class throughout, just in the same way as the manufacture of the diesel engine requires the greatest skill. It may therefore be accepted that, with good materials and workmanship, no trouble should be experienced in boilers working at the pressures and temperatures mentioned above.

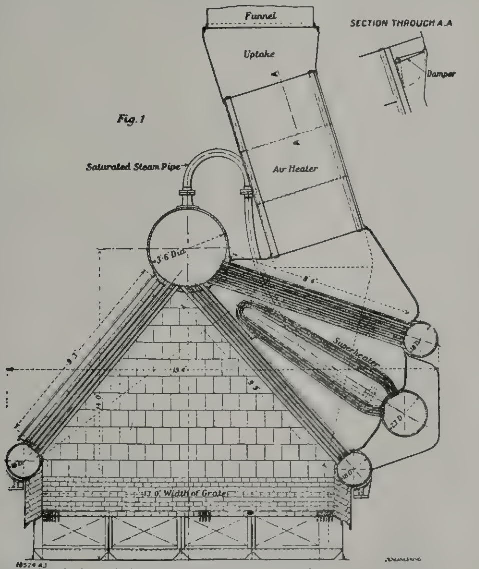


Fig. 1

Cross sectional view of the Yarrow water-tube boiler for the new turbine steamer King George V., 575 pounds steam pressure, 775 degrees Fahrenheit, boiler to be tested at 913 pounds.

Condenser Risk.

There is, however, one difference between land and marine practice; namely, that in the latter case there is always the risk of a leaky condenser allowing salt to enter the system, although it must be remembered that there are many electric power stations where the condensing water is by no means entirely free from salt. The presence of salt can be detected immediately by various means, and in the Navy, from the time a leaky condenser tube is discovered, to the time when this tube has been plugged and the installation is again under way, occupies only a very short period. Sir Charles Parsons has proposed to subdivide the condensers, so that one of them can be isolated if a leak is discovered. Both these methods are merely remedial, but with the investigations now being carried out, such, for instance, as adopting different materials for condenser tubes, it may be assumed that this trouble will be finally overcome. It is hardly conceivable that, with the skill of the engineer and metallurgist, progress along any promising line of development will be retarded because no means can be found of keeping salt out of the feed system. Even under existing conditions, Atlantic liners, cross-Channel boats, and other types of steamers, as well as vessels of the different navies of the world, are running satisfactorily with water-tube boilers.

Steam Joints.

Fear has been expressed that with high temperatures and increased pressures there will be difficulty in keeping steam joints tight, and that this will be more serious on board a vessel than in a power station, as the latter generally consists of a large open building and all joints are easily accessible. There does not seem to be any valid reason to fear this difficulty, for if proper materials and high-class workmanship are employed, steam joints can be made quite satisfactory. A suitably designed metal-to-metal joint with strong bolts and thick flanges should give no trouble. In one respect the problem is simplified in a marine installation as compared to land boilers, because in the latter case the units are usually much larger and the valves and pipes are, in consequence, very much bigger than on board ship.

For instance, the steam pipe from each of the Yarrow boilers at the County of London Electric Supply Company's station at Barking, working at 400 pounds per square inch, and 725 degrees Fahrenheit superheat, has a diameter of 8 inches, and joins up to 12-inch main steam pipe line. In a steamship of 24,000 shaft horsepower having six boilers of 575 pounds pressure and 750 degrees Fahrenheit superheat, the diameter of the main steam pipe from each of the boilers would be only 4 inches, and would connect into two 7-inch steam pipes in the engine room. The valves and boiler fittings would be of smaller size and their design, therefore, simplified.

Boiler Efficiency of 85 Per Cent.

In considering the problem of turbine installations with high pressure boilers, it may be assumed that a boiler efficiency of not less than 85 per cent will be realized when air heaters are fitted, and in the case of boilers with straight and well inclined tubes the rapid circulation of the water keeps the tubes clean, and therefore a high efficiency can be maintained over long periods of service. It may be of interest to give some particulars of two high-pressure boilers, coal-fired, which will be installed on a passenger vessel now built by William Denny & Brothers, for Turbine Steamers Limited, the managing owners of which are John Williamson & Co. In determining the type of boiler for this vessel it was necessary to select a design that would be suitable for general mercantile practice and one preferably free from as many bolted and riveted joints as possible, due to the high pressure to be adopted. It was also considered important that all the pressure parts should be as far as possible circular in section. After careful investigation it was decided to adopt the Yarrow type, and the order was placed for the two boilers by the main contractors, the Parsons Marine Steam Turbine Co., with Yarrow & Co.

The design of the boiler has been passed by the Board of Trade, whose officers have offered many valuable suggestions, and who have given every assistance to facilitate this new development. Each boiler has a total heating surface of 3420 square feet, of which the superheating surface is 870 square feet; in addition, there are 2200 square feet of air heating surface for preheating the air prior to its admission to the closed ashpit. The safety valves are set to 575 pounds pressure, and the final temperature will be from 700 to 750 degrees Fahrenheit. The test pressure is 913 pounds. The design generally, while not unlike that used in the Navy, has been based on mercantile practice and more closely follows the design of the Yarrow land type boiler now in use at several electric power stations.

Construction of Boiler.

The boiler consists of a forged steam drum connected to the three forged water drums by means of straight tubes expanded and bell-mouthed in accordance with usual practice. Between the two water drums on the right-hand side is a superheater which consists of a forged drum with a number of U tubes and which is placed between the two generating elements. The gases all pass up one side of the boiler and through the air heater situated above the boiler and to the funnel. The reason for adopting a single-flow type of boiler, where all the gases pass through one side, is because this design makes in this particular case a somewhat better arrangement in the ship than the double-flow type where the gases pass equally through each side. The generating element in the left-hand side of the boiler absorbs a considerable portion of the heat from the furnace by direct radiation, and it will be noted that the proportion of the total surface of the boiler subject to direct radiation is considerable, which is an important feature in modern water-tube boiler design, not only increasing the output and efficiency of the unit, but also providing a large amount of comparatively cool surface adjacent to the combustion chamber, which lengthens the life of the brickwork.

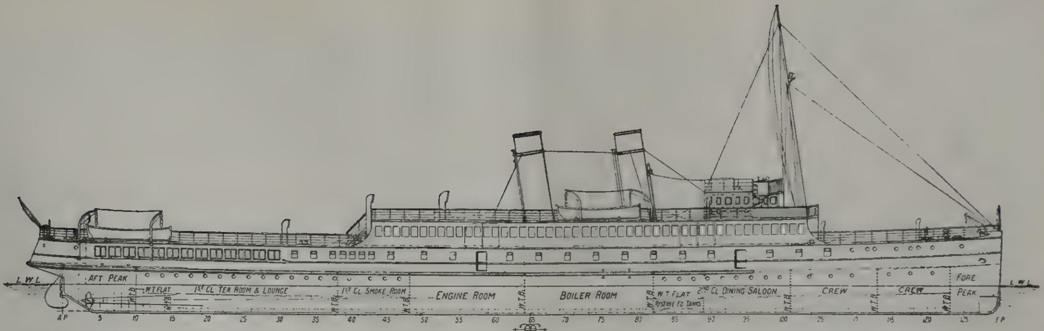
The admission of air for combustion is arranged in the following way: The cool air in the stokehold enters an opening between the inner and outer casings at the front of the boiler about 6 feet up from the firing-floor, passes up the double casing through the air heater, down the double casing at the back of the boiler into the closed ashpit, and so through the firebars. The efficiency of the unit is naturally increased by the air heater, which extracts heat from the flue gases, and in addition the air in its passage to the combustion chamber, as above described, takes up a certain amount of heat which would otherwise be lost due to radiation, and incidentally keeps the stokehold cool. Also the circulation of air in close proximity to the furnace lining helps to keep the brickwork at a temperature which ensures low cost of upkeep.

For controlling the supply of steam—especially as, unlike an oil-burning boiler, the supply of fuel cannot be quickly cut off—various means of regulation have been provided. It will be seen that a damper is fitted in the uptake at the side of the top of the air heater. When this damper is in its horizontal position the air passes through the air heater to the combustion chamber. When, however, the damper is brought to a vertical position the air from the fan passes straight up to the funnel, thereby short-circuiting the air heater and entirely stopping the supply of air for combustion. This arrangement would be used when the engines are stopped suddenly; e. g., when the vessel stops at a pier. Provision is also made for controling the speed of the forced-draught fan, thereby limiting the amount of air for combustion. A still further control is to by-pass the steam direct from the boiler to the condenser by the silent blow-off.

In preparing the design of a high-pressure boiler it is advisable to reduce the number of riveted and bolted joints to a minimum, and how this has been accomplished in the present case will be seen from the fact that the steam drum has no riveted joints at all and, apart from the attachment of boiler mountings, the only bolts are those required to secure the two internal manhole doors. In the water drums and superheater drum there are no longitudinal joints, and only one circumferential riveted joint securing the front end-plate in which the manhole is placed. The other end of these drums is solid.

All the drums have been manufactured by John Brown & Co., of Sheffield, and a short description of the process of manufacture may be of interest. The steel used is ordinary boiler steel of 26-30 tons, with 30 per cent elongation in 3-inch lengthwise, and not less than 20 per cent elongation in 3-inch tranverse. The large steam drum is made by the following method: A large octagonal ingot is forged under a hydraulic forging press to a round billet; it is then cut to a length which will give the weight necessary for the finished forging, and is carefully examined for any surface defects. The billet is then bored with a hole throughout its entire length large enough to take a mandrel for the second forging operation.

The second forging operation consists in expanding the billet to a larger diameter without increasing the length; the internal diameter after this operation is slightly less than the finished diameter of the steam drum. The expanded forging is reheated ready for the third operation, which consists in forging on a mandrel in such a manner as to increase the length without increasing the diameter. A larger mandrel is used of a diameter approximately that of the finished drum, and forging is continued until the required length is obtained. The thickness of the main body is now that required for the drum, plus machining allowances. The



Outboard profile of King George V. high pressure turbine passenger steamer, recently launched at Denny Brothers, Dumbarton, Scotland.

ends of the forging are left thicker to allow for the final operation, which takes place after the internal diameter of the drum is bored to the finished sizes. This last forging process consists in closing in both ends as nearly as possible to the required shape of the finished drum. The final closing-in is performed on a round bar or mandrel somewhat smaller in diameter than the manholes in the ends. The forging is then thoroughly annealed and sent to the machine shops, where the necessary mechanical tests are taken and the final machining carried out. The process of forging of the water and superheater drums is much simpler. The boiler tubes and superheater tubes are solid drawn cold-finished.

Boiler Fittings.

The problem of boiler fittings such as safety valves, stop valves, and joints, is one to which much care must be devoted. The safety valves require special consideration in design and construction for high pressures and temperatures. The ordinary safety valve with its small lift is a trap for grit and dirt when the valve is blowing off. The valve shuts down on this grit and soon indentations extend across the face and the high velocity causes grooves to be cut. The safety valves for the two boilers above referred to are of the high-lift type manufactured by Cockburns Limited, and either this type or the full-bore safety valve manufactured by the same firm would seem to meet adequately the problem of high pressures and temperatures. The stop valves and other fittings are of the usual design, strongly constructed and of suitable materials. The main stop valve has monel metal spindles, valves, and seats; but other materials have been found to be equally satisfactory. The joints, as already stated, are metal-to-metal, and the flanges are particularly thick so as to avoid the possibility of any distortion. The feed regulators are being supplied by the Aster Engineering Company, and the water gauges by Dewrance & Co.

With regard to the initial cost of a high pressure boiler, the price of the solid drums is at present greater than built-up drums, but a number of the fittings are common to boilers whether for high or low pressure, such as furnace fittings, casings, uptakes, air heaters, and brickwork, so that the total increase in cost is not considerable. It is estimated that the two boilers described above with forged drums for 575 pounds pressure cost approximately 15 per cent to 20 per cent more than similar boilers having the same total heating surface but having a boiler pressure of 250 pounds per square inch. If, however, a comparison is made on a more correct basis—that is to say, taking into account the fact that the quality of the steam from the 575-pound boiler is of a higher value than in the case of a lower pressure, then the cost of the high pressure boiler is very little more than the cost of the other. The saving due to the reduced heating surface required in the case of the high pressure boiler nearly compensates for the additional cost of the forged drums and certain other rather more expensive fittings. The initial cost of high pressure boilers is, therefore, no handicap to their introduction.

Motorship Versus Steamer

(Continued from Page 304)

pressure water-tube boilers and turbines; 111 shaft horsepower for low pressure turbines and cylindrical boilers; 104 shaft horsepower for diesel engines.

Lovett in reply stated that he believed the steam engine to be in "its second incarnation" and that it would "develop in the future as much as the diesel engine would."

McIntosh & Seymour Diesels

(Continued from Page 297)

controls the stroke of the fuel pumps and the length of time that the fuel valves are open. These levers are placed conveniently at the engineers operating station.

After the test, the engines were opened up and all parts inspected for wear. The cylinder liners and pistons still displayed the tool marks under the glassy finish produced by the 7700 miles of travel. The bearings were inspected and found to have produced a fine wearing finish.

The valves and piston rings were all found to be in excellent condition, free from carbon, and all working smoothly.

Also, as part of the ship equipment, there are two small auxiliary compressor generator sets of 100 normal horsepower. These ordinarily run as generating sets, but should the independent air compressor unit fail the two small units would supply enough injection air for the main engine, these units each driving 75-kilowatt generator.

The test was a marked success and was a source of satisfaction to both the builders and the Shipping Board.

California's De Luxe Ocean Ferry

Popular Coastwise Service between San Francisco, Los Angeles and San Diego

Coastwise flyer Harvard of the Los Angeles Steamship Company, steaming out of the Golden Gate

TRANSPORTATION systems, perhaps more than any other public agents, become with time representative of their locality and to mention one is to call to mind the other. It is doubtful, however, if many travel mediums and communities are held as synonymous by the traveling public as are California and the sister steamships Yale and Harvard in service between the state's three chief ports of San Francisco, Los Angeles, and San Diego. As a result of their faithful ferry-like and excellent service along the California coast, these liners, originally designed and built to provide express transportation between Boston and New York, have come to be regarded, both by residents of the state and travelers and shippers from all over the world, as California institutions.

Before the Great War the Yale and Harvard were brought to the Pacific Coast from the Atlantic and placed in service between San Francisco and Los Angeles. Following the entry of America into the world conflict they were requisitioned by the government, were completely depleted of their luxurious passenger accommodations, and were utilized as transports between England and France on the English Channel. For the duration of the war the liners proved their durability in the carrying of approximately 400,000 troops on these treacherous waters and won an enviable reputation for constancy and regularity of service.

With a complete realization of the merit of these two vessels and of their particular suitability for coastwise service, southern California capitalists purchased them from the United States government following the armistice and brought them into Los Angeles harbor shipyards, where they received a thorough reconditioning with practically every part excepting hulls and machinery renewed or rebuilt at an expense of approximately $1,000,000 for each ship.

Luxuriously equipped and perfect in every detail for their intended use, the sister ships were re-entered in the run between San Francisco and Los Angeles in the spring of 1921 under the ownership of the Los Angeles Steamship Company. In 1922 this service was extended to San Diego.

The provision for every comfort and possible mode of entertainment for the traveler on the Yale and Harvard by their operators has seen a continued increase in popularity for the liners, resulting in a sailing schedule of four sailings weekly from each of the three ports. A recent compilation of figures from passenger lists shows that during the year 1925 approximately 70,900 people sailed in and out of San Francisco on these ships. The traveling public is attracted to these liners by the very novelty of steamship travel, which offers recreation, a complete change of environment, and the spirit of fellowship always present at sea, the broad decks, luxurious staterooms and public saloons of the liners, and the excellent cuisine for which their dining saloons are noted. Since the man of affairs has learned that a real vacation, including complete change and rest, may be combined with a business trip, the liners are enjoying a popularity with the tired business man as well as with youth which always welcomes any diversion from life ashore and the novelty of dancing on the deep seas.

It should interest Pacific Coast readers and be a matter of great pride with them that the steamers Yale and Harvard are well up among the fastest ships in the American merchant marine. These two steamers have maintained a schedule calling for 21 knots service speed at sea and an 18 hour running time schedule between San Francisco and Los Angeles.

Typical de luxe twin-bed stateroom on steamers Harvard and Yale

Pacific Workboats and Their Power Plants

With the Los Angeles Boatyards

A busy scene in the boat parking basin of the Los Angeles Shipbuilding and Drydock Corporation.

WILLIAM MULLER, old time shipbuilder of Wilmington, California, claims the proud distinction of having built the first diesel-electric driven vessel in the United States. This is the yacht Velero II. She had a Winton diesel and Westinghouse generator and motor. Leaving port without any regular trial trip, she made a voyage of over 5000 miles. During this trip there was never the slightest hitch in any of the operating machinery. At completion of the voyage a total repair expense of $6.75 for renewal of a tube in an oil cooler was all that was needed to fit her for another run. Since that time Mr. Muller has been enthusiastic over diesel-electric propulsion for water-borne business and predicts it will be the future method of sea propulsion.

The two new diesel-electric drive tugs built for the Wrigley interests by William Muller are nearly ready for service.

A new yacht for Mr. Valentine is now in commission and will give good satisfaction to her owner, no doubt, as all of Muller's jobs do. Work on two additional tugs for the Wrigley interests will soon be started. There is a constant rush of repair work at this yard with little or no spare time for the hauling out ways.

Los Angeles Shipbuilding & Drydock Corp.

The yacht Invader, owned by Don Lee, has recently been overhauled and changed in her rig at the Los Angeles Shipbuilding and Dry Dock Corporation, San Pedro. The Invader will compete in the Lipton Cup Race to Honolulu this summer. With longer main boom and loftier masts, she made well over 12 knots in Santa Barbara Channel since her overhaul. On the race she will be manned by a professional crew.

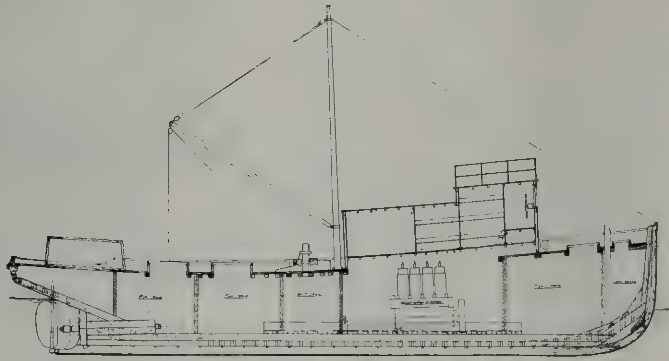
The Enchantress, owned by Morgan Adams, another contestant for the Lipton prize, has also been tuned up at this yard. Her chances for a win are considered good, as she is in splendid form. The Enchantress will be manned entirely by amateur yachtsmen.

Larson's Yard.

Al Larson's Boatyard at Terminal Island, San Pedro, is quite busy these days. Several gas engine power plants have been changed there. Among these, the Los Angeles Public Health Department's vessel S. D. Brooks has had an eastern gas engine removed and a 45-horsepower Fairbanks-Morse diesel engine installed. The Albacore, California State Fish and Game Commission motorboat, formerly engined with a gas unit has had a 60-horsepower Fairbanks-Morse diesel installed.

The Sweet No. 2 has also had her gas plant taken out and a Western-Enterprise 80-horsepower diesel engine supplied. At the time the engine change was made the below decks forecastle was changed to a hold for fish and new deck houses and pilot house built. The Success No. 3 has had a Western-Enterprise 110-horsepower diesel engine installed to replace a former gas power plant.

The gas workboat Costa Rica had her old engine replaced by a new



Inboard profile of 86-foot deep-sea fishing boat Western-Enterprise, recently completed at Larson's Boatyard, San Pedro. This fine trawler is powered with a 200-horsepower Western-Enterprise diesel engine.

The deep-sea fisherman Western-Enterprise just after launching at the Larson Boatyard, San Pedro.

Atlas-Imperial 65-horsepower diesel.

The Tug Jean, owned by the United Dredging Company damaged by fire, has been overhauled at a cost of $3000 by the Larson yard. Several Los Angeles yachts have been hauled out for the season's overhaul. Besides this work there is an average of 125 workboats a week on the several ways for cleaning and painting. This rush continues for about five weeks, the workkboats being from 25 to 75 feet in length. This shows the extensive business made by the small craft in the San Pedro district, as all the other workboats yards are just as busy.

Captains C. L. Miller and William Sheppard of the California Fishermen's Association, Inc., have under construction at this yard a sardine fishing boat and cannery tender. She is 73 feet by 18 feet 6 inches, with a depth of 9 feet. She will be powered by an Atlas-Imperial diesel of 110 horsepower and will be ready for service the first of July. The two owners have for years been in the fishing business on the Pacific Coast, using smaller craft. This is their first venture in the deep sea trade, although the association with which they are identified have many smaller boats. Another and larger vessel will probably be added to the fleet shortly. The headquarters of the association are at 647½ Thirteenth St., San Pedro, California.

Harbor Boatbuilding Yard.

The Harbor Boatbuilding Yard at Terminal Island, San Pedro, California, is, like most similar establishments, busy at overhauling and building of workboats. This firm also designs and builds yachts.

To facilitate quick repairs of all kinds, complete machine, blacksmith, and electric shops are part of the plant. Ten ways, two of which can be worked double, handle crafts up to 300 tons. This is a closed corporation, John Rados and his father being in control. Some 75 men are employed, and a business of around $200,000 a year is done. They have in hand, besides repair work, two 75-foot fishing workboats for Captain Martin Trutanich, each of which will have a 120-horsepower Fairbanks - Morse diesel engine.

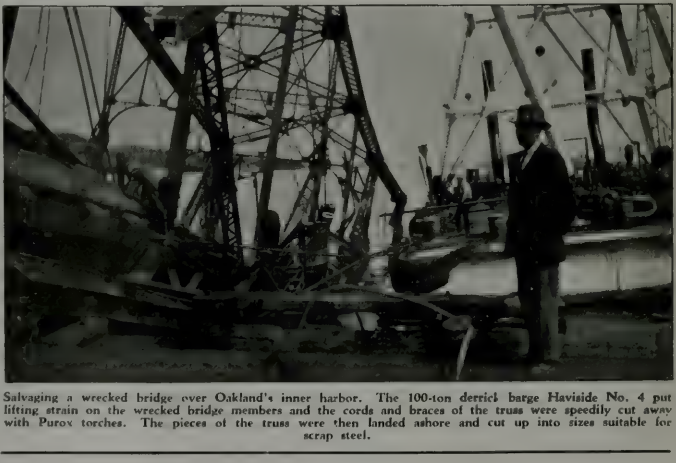
Seacraft Corporation.

The Seacraft Corporation of San Pedro reports good business. This firm specializes in small cruisers, of which nine have recently been completed. The ways are busy hauling out pleasure boats, and a force of thirty men is kept at work there.

Fellows & Stewart.

Fellows & Stewart's Yard at San Pedro has been doing a big business the past few months. Two of their standard 47-foot cruisers and four water taxis have recently been completed. Six of the 32-foot type of cruisers have also been delivered. In addition the yard handled considerable overhauling and repair work. A recent addition to the shops has been made by the erection of a 60 by 140 foot two story building. The upper floor will be used as a joiner shop, the lower for hull construction. During the past year this yard has tripled the producing capacity of the plant, their products being well appreciated by those who operate them.

W.n.on powered towboat David P. Fleming, of the Wrigley Transportation Company's fleet, Los Angeles Harbor.



Salvaging a wrecked bridge over Oakland's inner harbor. The 100-ton derrick barge Haviside No. 4 put lifting strain on the wrecked bridge members and the cords and braces of the truss were speedily cut away with Purox torches. The pieces of the truss were then landed ashore and cut up into sizes suitable for scrap steel.

Two Notable Yachts Remodeled

THE power schooner Mariner was built in Essex, Massachusetts, in 1922. She was of the regulation Yankee Gloucester fishing type. Her speed was such that she qualified for a yacht and was owned for some time by Captain L. A. Norris of San Francisco and was the winner of the San Francisco-Papeete race last year. The Mariner was recently purchased by John Barrymore, the actor, who, in his love for the sea, wanted a craft which would be a racer as well as a sea home. The new owner desired changes made in many particulars, and the job was given to the boatyard of W. F. Stone & Son, Oakland. Lester Stone, manager of the yard and himself a yachtsman, was given practically carte blanc in the matter of expense, and a very creditable result has been achieved.

The Mariner, of wood and exceptionally well built, is 93 feet in length, 23 feet 8 inches beam, and has a depth of 11 feet, giving her close to 100 tons register. Originally she had an eastern-built gas engine for auxiliary power. That this had to give way to a more modern and powerful diesel was obvious; consequently an Atlas-Imperial 6-cylinder 125-horsepower unit was installed.

The interiors were practically rebuilt to meet the ideas of the new owner. The original arrangements were ripped out. The owners' quarters of one double and one single berth stateroom and bath, also two double and two single cabins and bath for guests, were built. A most commodious lounge or living room, the whole beam of the vessel and nearly twenty feet fore and aft, opens from the deck and sleeping quarters. This is finished in natural teak, while the cabins are while enamel with teak trim. Quarters for officers and crew forward are roomy and well finished. The galley is on deck, just aft of the foremast and over the engine, and is well lighted and ventilated.

A Westinghouse electric generating set driven by a Winton engine carries a load of 7 kilowatts, furnishing current for an electrically operated Rix air compressor, electrically driven bilge, fire, deck, and septic and sanitary pumps.

The upholstery and furnishings are in good taste. Taken as a whole, the Mariner is a very comfortable floating home. Her lines insure great seaworthiness as well as speed. In her full suit of sail with a few improvements in rig and with engines sealed, she will be an entrant for the Lipton Cup Race to be run from San Pedro to Honolulu this summer. She will fly the flag of the Newport Harbor Yacht Club and will have the well known "Doc" Wilson as sailing master.

A special fishing tender 20 feet long and powered with a Redwing 25-horsepower engine was built at Stone's yard for use with the Mariner. Special davits were designed by Mr. Stone to carry this comparatively heavy craft.

Mr. Barrymore was very well pleased with the completed job when he received her a short time ago. She is now conservatively worth some $125,000, the remodeling having been effected with quality rather than economy in view. With her Atlas-Imperial diesel engines and large fuel tanks, the Mariner has a power cruising radius of 3000 sea miles. Her speed with the new power plant was well over 9 knots an hour on trial trip, which is considered good for so large an auxiliary craft.

Yawl Yacht Westward.

The yawl yacht Westward, formerly owned by the late J. R. Hanify, has had her rig changed to the Marconi type. The new mainmast is 78 feet, deck to truck, and the jigger is also a husky stick. With her sails divided she will be easier to handle, and it is believed her speed will be somewhat increased. The sails were made by Ratsey and Lapthorn and the changes were designed and the work done by Lester Stone at Oakland.

At the Engine Shops

THE diesel engine building shops of the Pacific Coast continue busily building workboat size diesel engines not only for Pacific Coast workboats but for many marine installations in various foreign countries. That this local manufacturing continues under severe competitive conditions speaks volumes for the quality of Pacific Coast engines. The following items are gleaned from reports by the executives of several engine building firms.

Union Gas Engine Company.

Union Gas Engine Company reports recent delivery, after very severe and highly satisfactory test runs, of a 225-horsepower, 6-cylinder, fully reversible diesel engine for the United States Bureau of Fisheries fish patrol boat Brandt, now building at the Kruse and Banks Shipbuilding Company, North Bend, Oregon. This order came from the Bureau as the result of the excellent three-year record of a Union 65-horsepower diesel engine in the fish patrol boat Kittiwake.

The Union Gas Engine Company is keeping a double shift of mechanics very busy turning out new jobs. Besides the standard smaller sizes, they are getting ready a heavy 300-horsepower diesel for the new boat building at San Diego for Captain Medina. This power is a bit over the average for that class of fishing craft and will give good speed without doubt. The Union shops are also making a special phosphor bronze shaft for the craft, as the warm salt water along the lower California coast soon corrodes steel. In addition to this heavy unit, a 225-horsepower diesel engine is under construction for the Luzon Stevedoring Company of Manila, Philippine Islands. The demand for San Francisco Bay built diesels at various ports shows that quality counts.

Washington-Estep.

"The sales of Washington-Estep diesel engines from which we get the greatest satisfaction," recently declared Francis G. Frink, secretary of the Washington Iron Works, manufacturers of these engines which are fast becoming popular on the Pacific Coast, "are the second sales to the same owner. This is a real proof of the satisfaction which they give.

"A short time ago we received an order from Captain Ramwell of the American Tow Boat Company of Everett, Washington, for a 225-horsepower diesel engine to replace the steam equipment in his tug Irene. This was given to us because of the splendid results obtained from the first engine built by our company, a 110-horsepower diesel engine which has been operating for four years in the tug Elmore. Such orders as that show what the owners of these engines think of them."

Mr. Frink also cited the case of the Canadian Fishing Company which has bought seven additional Washington-Estep diesel engines this year after operating six of them last year. He states that among the other companies which have purchased additional engines from his company after using some of them are the Kadiak Fishing Co., the Gilkey Bros. Towing Co., Gulf of Georgia Towing Co.

These engines have established a fine reputation among boat operators because of the simplicity of their construction and the dependable service they have rendered.

Washington-Estep diesel engine representatives in San Francisco, the W. H. Worden Co. Inc., report many inquiries concerning these units. To better show prospective buyers, a new 110-horsepower 3-cylinder engine has been placed on view in the warerooms of these agents, 126 Pine street, San Francisco. The Seattle shops are busy on a number of new orders for engines ranging from 90 to 600 horsepower for new and speedy workboats in the Puget Sound district.

Western Enterprise Busy.

At the plant of Al Larson, boat builder, San Pedro, California, during the week of May 10 to 15, the following boats were on the ways, having Western-Enterprise diesel engines installed: The Sweet No. 2, a 68-foot tender, was powered with an 80-horsepower unit; the Success No. 3, a 72-foot purse seiner in which a 110-horsepower engine is going; and the Western-Enterprise, an 86-foot deep sea fisherman, installing a 200-horsepower propelling engine. This boat was named in honor of the company's excellence of diesel power eqnipment.

For the week of May 17 to 22, the Western Machinery Company report the following installation of a re-powering job as under way: The California, owned by Larco Brothers of Santa Barbara, replacing a gas engine with a 65-horsepower Western-Enterprise diesel; the Betty, out of San Diego, is a new boat having an 80-horsepower unit installed.

Within a month, two 160-horsepower, 6-cylinder twin engines were shipped to the Gulf Fisheries of Galveston, Texas, for a 126-foot cruiser, the Sebonac, also a 165-horsepower engine for the Peden Iron & Steel Company's harbor tug.

Considerable activity in the mining districts, combined with their marine business, has kept the plant of the Western Machinery Company operating overtime in an effort to keep up with the increased demand for Western-Enterprise diesel engines. From the present outlook, it seems safe to predict a continuance of the present healthy tone of manufacturing operations if the interest in diesel power as expressed by inquiries may be taken as an index of what is to follow.

Atlas-Imperial Shops Working Three Shifts.

The Atlas-Imperial Engine Company of Oakland, California, report many orders and deliveries for May and June. Among the more prominent of the installations made during that period are the following:

One, 120 horsepower 6 cylinders, Atlas-Imperial full diesel on yacht Valador, Los Angeles;

One, 75 horsepower, on yacht Dwyn Wen;

One, 140 horsepower, 6 cylinders, on yacht Donossari;

One, 75 horsepower, 3 cylinders, on fishing boat Cleopatra, Los Angeles;

One, 65 horsepower, on boat Costa Rica, Los Angeles;

One, 125 horsepower, 4 cylinders, on new fishing boat Gloria R, Los Angeles;

One, 170 horsepower, 6 cylinders, on workboat for Frank Mitchell, San Diego;

One, 50 horsepower, on workboat Springtime, Los Angeles;

One, 120 horsepower, on yacht Mariner for John Barrymore, San Francisco.;

One, 110 horsepower, on new workboat W. F. Wood, Los Angeles;

One, 120 horsepower, 6 cylinders, on yacht Katinka for Fred Albertson;

One, 75 horsepower, 3 cylinders, on boat Arditto, San Diego;

One, 75 horsepower, 3 cylinders, on Union Oil harbor barge No. 2, Los Angeles;

One, 65 horsepower, 3 cylinders, on fishing boat Astorian;

One, 50 horsepower, 3 cylinders, on boat Daisy M. Redondo;

One, 50 horsepower, 3 cylinders, on boat Daisy M. II., Redondo.

One, 50 horsepower, 3 cylinders, on boat Enterprise, Los Angeles;

Two, 250 horsepower, 6 cylinders, on oil barge Richlube, San Francisco;

One, 150 horsepower, 6 cylinders, on Island Emperor, Stockton;

One, 150 horsepower, 6 cylinders, on Island Empress, Stockton;

One, 110 horsepower, on Golden Eagle, Petaluma;

One, 65 horsepower, Paul Martin River Sand & Gravel Co.;

One, 90 horsepower, to Richmond Navigation & Improvement Co., Richmond;

One, 50 horsepower, to John Cresci, Monterey, for new sardine boat;

One, 125 horsepower to San Francisco International Fish Co., for new trawler.

One, 125 horsepower, in trawler Crescent No. 2 for F. E. Booth Company, San Francisco;

Two, 375 horsepower to Shaver Transportation Company, Portland;

One, 200 horsepower to Atlas-Imperial agency in Seattle;

One, 50 horsepower to Ferrier and Lucas, Vancouver, B. C.;

One, 65 horsepower to Ferrier and Lucas, Vancouver, B. C.

In addition to these diesel installations, the Atlas-Imperial Engine Company report the sale of thirteen gas engines for marine installations, aggregating 296 horsepower.

New Fleet for Swayne and Hoyt

MR. HENRY F. GELHAUS, Port Engineer for Swayne & Hoyt, Inc., of San Francisco, speaks very highly of the Norfolk Shipbuilding and Dry Dock Company of Norfolk, Va. It was at this yard that the four steamships recently acquired from the Shipping Board by Swayne & Hoyt have been reconditioned. These vessels are the Point Bonita, (formerly Bound Brook), Point Reyes, (formerly Holyoke Bridge), Point Firmin, (formerly Continental Bridge,) and Point Sur, (formerly East Chicago).

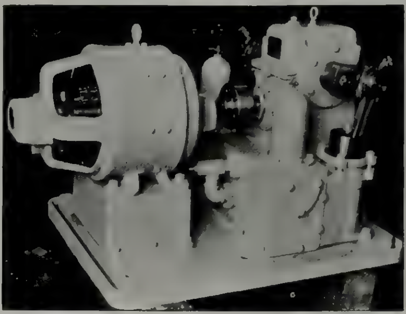
These four vessels are all turbine driven, and being handy sized will make a fine addition to the privately owned fleet which takes the place of the Shipping Board craft formerly operated by this progressive firm.

Under Mr. Gelhaus' supervision, together with the fine organization of the yard, the several units have been put into first-class condition. They are good carriers, with economical steaming qualities. The operating firm believe that good judgment was shown in their selection as well as in choice of the Norfolk Yard as a repair base for them.

Winton Power on American Yachts

THIS spring has seen unusual activity in American yachting circles. More large seagoing yachts have been launched and placed in commission in the past two months than in any other similar period for many years. Many of these ships are noteworthy creations. It is interesting to note that all of them are powered with diesel engines, and it is quite evident that this year marks the permanent passing of steam as motive power for craft of this kind built in American shipyards. The diesel engine industry has gone ahead with leaps and bounds in America in the past decade and some of the American type diesels are unexcelled anywhere in the world.

One of the American pioneers in this field is the Winton Engine Company of Cleveland, Ohio. Winton diesel engines are quite generally recognized as typical of the best that American builders have produced in this type of power plant. The company was founded in 1912 by Alexander Winton, world-famous engine designer and builder, and has constantly improved and refined its product. Many of America's fine yachts are now powered with Winton diesel engines, and the number is constantly being augmented. This in itself, of course, bespeaks the high standing of this make of engine in the American market and presages a much wider range of activity for this company in the near future. No doubt, we shall very shortly see some of our European and South American yachts being powered with this American-made diesel.



Electrically driven Winton fire and bilge pump.

All of these ships are typical of everything that is best in modern high class yacht construction and it is needless to say that the finest power plant possible to secure was installed.

Fine Yachts Recently Converted From Steam to Winton Diesel.

Yachts	Gross Tonnage	Total Horsepower
Elfay	313	135
Guinevere	574	700
Alcyone	453	450
Velero II	265	270
Cutty Sark	246	200
Aloha	659	900
Constellation	157	150

The Elfay was the first American yacht equipped with diesel electric drive.

Winton Powered Workboats.

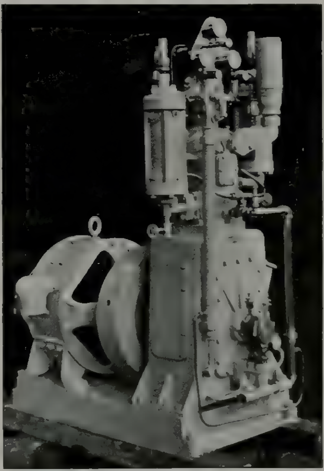
The Winton Engine Company also has been very successful in the number and character of towboats and commercial vessels powered with their engines. Typical towboat installations are the D. M. Renton and David P. Fleming, both owned by the Wilmington Transportation Company, of Wilmington, Cal. These are 85 foot boats, each powered with a six-cylinder 350 h. p. Winton diesel. Another is the John F. Craig, a 92 foot towboat, owned by Craig Shipbuilding Company, of Long Beach, Cal., and powered with a six-cylinder, 350 h. p. Winton Diesel. At present the Winton Engine Company is building sixty-two diesel engines of 150 h. p. each for use in U. S. Government 100 ft. Coart Guard vessels. These sturdy little ships get very rough usage and power plant was selected with the aim of insuring dependable economical propulsion in any kind of weather.

Fine Yachts Recently Launched and Powered with Winton Diesel Engines.

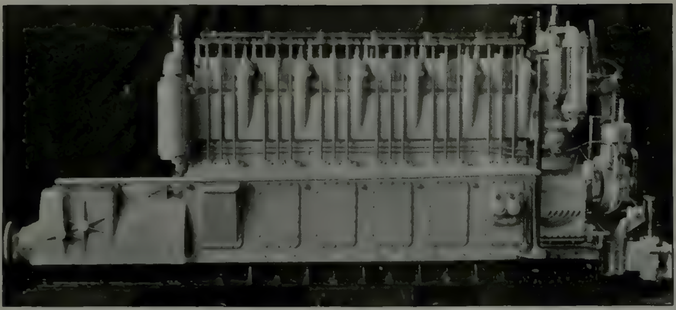
Yacht	Owner	Length O.A.	Total Horse Power
Pawnee	Harry Payne Bingham	160 ft.	900
Arcadia	Galen L. Stone	188 ft.	1600
Savarona	Richard M. Cadwalader, Jr.	185 ft.	1600
Josephine	E. S. Burke, Jr.	140 ft.	550
Robador	Robert Law, Jr.	160 ft.	900
Siele	John H. French	124 ft.	600
Shadow K	Carl G. Fisher	150 ft.	1000

In addition to its diesel engines, this company builds a line of highly developed, efficient gasoline engines and all of the units needed for complete marine engine room equipment. The gasoline engines are of four, six, and eight cylinders, ranging from 7½ to 350 horsepower, and are designed especially for yachts, passenger rail cars, locomotives, electric generator sets, pumping sets, cranes, hoists and shovels.

The fire and bilge pump is of the two-cylinder type, with a cylinder bore of 5 inches and a stroke of 6½ inches. This piece of equipment is a compact and efficient unit, having a displacement of 132 gallons at 120 revolutions per minute, and 75 pounds pressure. Driven by a 10 h. p. marine type electric motor, through a flexible coupling and worm gear reduction box which, together with the pump are all mounted on a common bedplate, in which is cast a deep gutter so that all leakage is drained off, insuring cleanliness. This pump is designed especially for large ocean-going yachts; is



At left: The Winton powered yacht Sirocco. Above: Winton electrically driven auxiliary compressor.



The starboard side of the Winton diesel engine, 350 horsepower on six cylinders.

lined with the best grade of bronze suitable for salt water service, and fitted with Kinghorn valves of ample size. Another auxiliary is a single cylinder air compressor of the three-stage, progressive type, driven by a 115-125 volt electric motor. The cylinder and head are made of close-grained charcoal iron. The high stage piston is of steel, and is of the built-up type, thereby simplifying assembly of high pressure piston rings. High pressure and intermediate stage valves are made of chrome vanadium steel. Intake and exhaust are interchangeable in each stage. Chankshaft is made of .30-.40 carbon open hearth steel forging. Top crankcase is made of close grained charcoal iron, and is fitted with large handhole covers for inspection and adjusting of main bearings and connecting rod bearings. Bottom crankcase is of cast iron, and carries the main bearings and crankshaft.

Located on the New York Central Railroad, in Cleveland's busy west-end, the plant of The Winton Engine Company is one of the finest of its kind both as to the structure itself and its equipment. The entire plant is of the daylight type, steel and glass, with fireproof roof, and the various units comprising the equipment are up-to-the-minute in design and of proper size to insure efficient and economical production.

The machine shop occupies two of the four main buildings and covers a floor space of 130 ft. x 300 ft. Between the two machine shop buildings are located the water-test department and forge, with adjacent heat-treating room. In one end of the machine shops is the rough-stock room, including receiving room. The other two main buildings are occupied by the assembly department, 100 ft. x 360 ft.

At one end of the assembly floors is the finished stock room, and above this is located a modern, well lighted engineering department and drafting room. Separate buildings are given up to the pattern shop, boiler house and sand-blast house. Each of the main buildings is equipped with a crane traveling the entire length of the building, and also numerous stationary jib cranes. The various departments are so arranged that all materials pass through the plant in proper sequence, minimizing handling and insuring speed and economy in operation.

All rough castings requiring hydraulic test are sent to the drill presses, from which they go to the water-test floor, and from there to layout tables. Castings not requiring this test go direct to the layout tables. Heavy castings such as bases, bed plates, frames and grinders go from layout tables to planers. From the planers, these castings are moved by traveling cranes to the radial drill department. Here the parts are drilled and tapped efficiently, due to proper arrangement of machines, eliminating unnecessary handling and moving by crane. A battery of Lucas mills do practically all the boring and milling. These machines, as well as the numerous milling machines, engine lathes, cylinder grinders, gear hobbers and shapers, and vertical mills are also arranged to the best advantage, in order to expedite production. Screw machines and drill presses are also arranged with the same idea in view. The machine shop is equipped throughout with the latest types of special tools, each designed expressly for accuracy and speed in performing its particular work.

From the drills the bases are sent to the horizontal spindle boring mills. The bearing-seatings for a whole base are all bored at one chucking so that the bearing-seatings are in perfect alignment.

The assembly department is so arranged that all work can be performed with minimum effort. The heavy parts are all carried direct to the various units on which they go. The smaller parts are assembled on side floors, from where they are carried either by jib crane or traveling crane to the engines as they are being erected.

Each unit when completely assembled goes to the testing floor, where it is given a most careful inspection, and is required to undergo a prolonged run at full horsepower rating. Slots are provided on stands on the test floor so that engines can be bolted to the test bed at any place. Jacket water for engines under test is supplied by means of trenches and tunnels which also furnish and take away the cooling water from the hydraulic dynamometers on which all Winton marine engines are tested. After the unit has passed its test it is painted and then lifted aboard the railroad car. All Winton engines are shipped set-up, thereby assuring proper adjustments upon delivery at destination. Loading platforms are on the New York Central tracks which run into shipping room located at one end of one of the assembly floors.

One end of the assembly bay in the Winton Engine Company's plant at Cleveland.

Auxiliaries-Ship Supplies-Marine Equipment

Cutting Down Operating Costs

AT no time in the history of shipping has so much attention been paid as at present to the problem of reducing operating cost but practically all effort so far has been expended in developing efficient propulsion machinery.

Shipping statistics show that fifty to sixty per cent of the out of pocket operating costs are absorbed in "port turn-around," due entirely to methods of cargo handling. The problem of reducing this cost is considered for the port engineer to solve, and in some measure stevedoring and detention costs have been reduced by equipping docks with cranes and other cargo handling machinery. However, such equipment, even in up-to-date ports, is available on only a limited number of docks and its use is therefore limited.

While associated with a terminal enterprise in New York in 1920 Mr. C. W. Daughs has opportunity to study at close range, cargo handling, and since then has studied this problem in various American ports. He found the following to be the principal reason for the high cost of "port turn-around," viz: repeated piece handling:

Loading: 1. Piece by piece or package by package into sling loads at shipside for hoisting into holds;

2. Piece by piece from these sling loads into stowage;

Discharging: 1. Piece by piece in holds into sling loads for hoisting onto docks, cars or lighters;

2. Piece by piece from these sling loads and repiling onto docks or reloading into cars or lighters.

Mr. Daughs also found that present type cargo gear has no flexibility. Loading or discharging, loads move between fixed centers at shipside and in holds, thus always presenting the problem of having a gang of men available to immediately move loads out of way to make room for following load, thus interfering with free and continuous cargo flow.

Daughs' Handling Methods.

As a result Mr. Daughs has developed methods for handling and stowing in units, many classes of cargo, such as lumber, sacked and boxed merchandise, including all such products as move from Pacific ports, designing for this purpose the following equipment:

1. Inexpensive, light weight containers having a wide range of flexibility by inches in height and width;

2. A new type of cargo gear—a ship crane to replace winches and booms—of which boom functions with speed and flexibility of an industrial crane, having load hoisting, boom luffing and sluing movements.

A Daughs ship crane was recently installed on the steamship Catherine G. Sudden, to serve Nos. 2 and 3 hatches, replacing four winches and four booms. Following is a brief description of this crane:

Engine 10x10, steam taken from ship's boilers and exhaust steam returned to ship's condenser;

Load hoist drum, speed of 150 ft. to 200 ft. per minute on whip line;

Boom hoisting and lowering, speed at end of 65 ft. boom of 200 ft. per minute;

Sluing to right or left, two to four revolutions per minute, crane having 360 degree swing;

Hoisting capacity, 5 tons at 50 ft. radius of boom;

Radius of crane swing 7¾ ft.;

Weight of crane, approximately 21 tons—no ballast required;

All operations, hoisting, boom luffing, sluing can be executed separately or simultaneously;

To prevent swinging of loads when handling cargo in open roadstead, a small friction drum with tag line is provided, thus insuring same load control as is possible with winches.

Crane is mounted on foundation in such manner that it is impossible for it to jump out of its bearing in a heavy sea. Boom is lowered and fastened into a boom rest, when at sea.

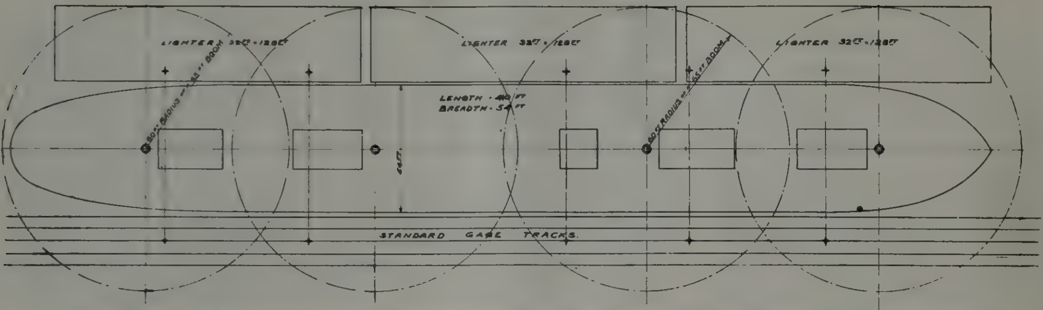
Crane foundation is circular, diameter 10 ft., with height according to specifications.

Listing of vessel does not affect operating of crane.

Advantages.

Loading and discharging, crane can pick up or place cargo over a wide area at shipside, cargo handling can be carried on through each hatch from both sides of vessel at the same time, for example: It can reach full deck area of lighters on offshore side, and at the same time on shore side can take from or deliver cargo to several box, gondola or flat cars. The crane

Three views showing the Daughs crane on the Katherine G. Sudden discharging ties at the Southern Pacific Wharf, Oakland, California.



Typical diagrammatic plan showing 8800-tonner equipped with four Daughs cranes, discharging to lighters alongside and pier simultaneously.

is particularly efficient in handling heavy machinery, structural steel, pipe, long timbers, due to its various operations making possible rapid maneuvering of long articles through hatchways. When handling such cargo as sulphur, ore, coal, coke, sand, grab buckets can be operated with the crane. Each load movement can be made a finished move, and as a result rapid and continuous cargo flow can be maintained.

Steam, electric, gasoline or compressed air power can be applied to the operation of this crane.

Use of the containers designed by Mr. Daughs does not involve any cargo space loss. When a hoist load is suspended the container compresses it together with a uniform pressure from all four sides toward the center of the load, and when deposited in hold load retains its compact condition.

Comparative Performance.

Two cargoes of railroad ties have been handled by the steamship Catherine G. Sudden since installation of the crane, and it has been clearly established that the crane is correct in mechanical design, flexible and rapid in its various operations, and that in connection with the unit method of handling and stowage, does substantially increase cargo flow and reduce stevedoring costs, as well as the further fact that it is possible to accomplish as compact stowage in units as is possible in piece stowage.

The statement herewith briefly shows what was accomplished in face of many obstacles such as are always encountered by new machinery and methods. After the crane is properly broken in, cargo properly prepared and delivered at shipside, and stevedores understand what is required of them, a fifty per cent better performance will result.

A vessel properly equipped would have one crane to each hatch, and based on the foregoing performance of quantity per gear, operation of such vessel would show a marked saving in "port turn-around."

	Nos. 2 and 3 hatches, served with crane, unit stowage	No. 1 hatch served with winches-booms, piece stowage
Trip No. 1.		
Discharging:		
Average discharge per hour	27.2 MFBM	23.2 MFBM
Quantity handled per stevedore man hour	4.5 MFBM	2.3 MFBM
Trip No. 2.		
Loading:		
Average loading per hour	37.0 MFBM	29.0 MFBM
Quantity handled per stevedore man hour	3.7 MFBM	2.9 MFBM
Discharging:		
Average discharge per hour	40.0 MFBM	31.0 MFBM
Quantity handled per stevedore man hour	6.6 MFBM	3.1 MFBM

An Acid Proof Paint

THE protection of tank steamers against damage by sulphur and other acids present in crude oil has been long a problem of maintenance for the operators of tank fleets.

After much research work and many trials, the International Compositions Company of New York has succeeded in evolving an acid proof paint which appears to solve this problem. This material is being put on the market under the name of "Rubshell." It possesses four qualities which make it valuable as a protective covering for the inner surfaces of tank steamers and for steel work in petroleum refineries.

First, it is permanently proof against the action of diluted sulphuric acid such as is very often found present in the residue in the bottoms of tanks in tank steamers and in gaseous form in the vapors from petroleum under the decks and hatch coverings of tankers.

Second, this material is entirely insoluble in petroleum, benzine, or any distillate of petroleum.

Third, it is quick drying and can be applied without danger of explosion in the tanks of steamers, providing ordinary ventilating arrangements are adopted.

Fourth, it has very good adhesive qualities when brought into contact with the true surface of steel plates.

Samples of this material will be sent free of charge to the owners of tank steamers and oil companies in the form of two sample plates, one of which is treated with Rubshell and one in the natural state. These two plates are connected by an asbestos tape and it is recommended that they be tried out in the bottoms of the tanks of tank steamers with the asbestos tape over the keelson in such manner that it may be easily found and the plates drawn out of the residue in the bottom of the tanks.

The difficulty and expense of cleaning the bottoms of tanks of old tankers is one of the chief obstacles to the marketing of this material. In an experimental cleaning of one tanker, after the residue had been mechanically removed as completely as possible, a large quantity of sawdust was used in scraping up the corners and joints of the plates. The bottom was then cleaned with a strong solution of caustic soda and, after this solution had been thoroughly removed, was cleaned again with turpentine, a very expensive process both as to labor and materials. And even after all of this trouble had been taken, when the surface was painted, only one-half of the paint stuck.

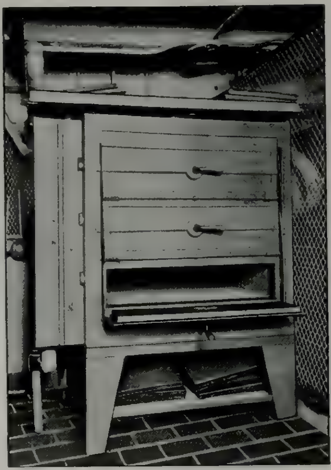
The International Compositions Company, in order to introduce Rubshell, is making an offer that they will apply this material free in one tank of any old tank steamer after said steamer has carried a cargo of benzine in said tank.

Advantages of Electric Cooking on Shipboard

AFTER oil fuel had become an accomplished fact for steamships, it was still customary to use coal in the galley fires. This necessitated carrying a supply for this purpose only. The quantity was small in comparison with former lots, but it made dirt to load it. This dirt hung around the decks, too, every time the galley bunkers were refilled. Then the ashes were a nuisance. Unless carefully dampened the dust flew over everything, and many the row caused by this alone. Then an inventor brought out an oil burner for the galley and bakeshop. This was a great advance, but like most things to handle oil it had its drawbacks. Leaks would occur. Then again the cooks did not altogtther understand oil fuel burning, and at times the expert from the engine room had to be called to get things going so dinner could be cooked.

Advances were made, however, and the oil burners so perfected that little or no trouble was had. In all these systems there either had to be electric power, steam or compressed air to operate them. But at that they were away ahead of the old coal nuisance. Then an advanced thinker and inventor devised an electric range. It was such an improvement on the former methods that it soon became a favorite. The first of these units had to be handled very carefully, and renewal of elements was often necessary. Further improvements were studied out, and difficulties were overcome until the electric range became as reliable as a flatiron. Its advantages over all other sorts of heat were so obvious that there was no dispute about it.

It was claimed though, that the system was not quite as efficient as direct application of fuel. But the amount of fuel used is so slight compared with the advantages as to be of a negligible quantity. And the manifest gains in time, temper, regulation of heat, flexibility and cleanliness were so pronounced that the little extra cost of fuel was more than met. Better and better elements were brought out, resulting in high power savings, until the use of electric ranges has become practically universal. In fact, nearly every new passenger vessel is fitted with one or more. The Matson liner Malolo, as also the Maui of the same line are electrically equipped. So are twelve of the Dollar liners, several of the Standard Oil tankers, Admiral liners, the big and favorite steamer H. F. Alexander, and the U. S. S. Langley. All these mentioned have the improved Edison Electric Appliance Company's special made ovens and ranges. This firm claims that as they have made a special study of cooking units they have naturally brought out all the best and desirable points, discarding such as made for trouble.


Edison electric baking oven on Matson Navigation Company's steamship Matsonia.

By the use of these appliances the galleys are much cooler and cleaner. They are always ready at the snap of a switch to get to work. No delays are required in the way of fire lighting or starting blowers or pumps. A quick, easy or fierce heat can be had at an instant's time. Ovens are so arranged that several sorts of food can be baked at one time, with no odors intermingled, and with heats all different, or the same as desired. Slow steady sorts for one kind of food, and quick and sharp for others. That this is an ideal way to prepare food is without dispute. And while the ovens are in operation, with perfect control of temperatures, the range proper can be heated for broiling or frying, and also for the boiling of vegetables. One part of the range top can be red hot, and another just at a mild heat. All this is controlled by the switches. In the matter of durability, too, the Edison Company claims that their improved units, cast into the metal of the range tops are practically indestructible, and will give a minimum of burn-outs.

Saving of space is also another factor of advantage in electrically operated galleys. This is quite a feature when every square foot of room has to be figured out by the naval architect. Another marked advantage which will especially commend itself to the engine room force is that with electrical equipment it is not imperative that there be steam on boilers to operate the galley. Even with the ship's dynamos shut down, current can be led aboard from shore lines and the preparing of food gone on with as usual. In many ports of the world, fires are not allowed at certain docks and wharves. Then all hands are compelled to get their meals ashore. This is a cause of much discomfort and is also expensive. With electricity used there is none of this nuisance. Cooks and stewards who have been shipmates with these latest appliances speak in high terms of them. And as the advantages are so many it is more than probable that in a few years a direct fired galley will be as rare a feature as an old fashioned single topsail.

Edison electric range on Matson Navigation Company's steamship Matsonia.

Cunningham Auxiliaries for Motorships

ALLAN Cunningham of Seattle is supplying much of the auxiliary machinery for most of the motorships now building or recently built on the Pacific Coast.

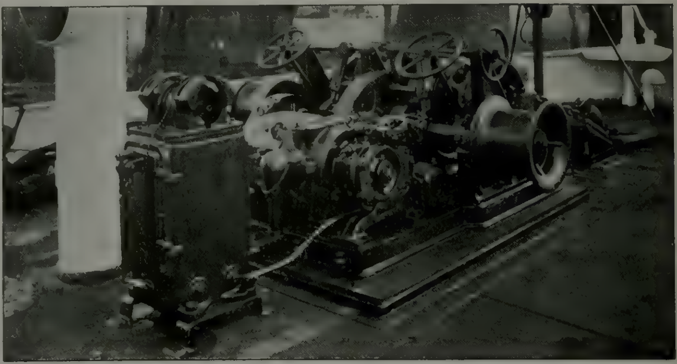
The illustration reproduced with this article shows the electric anchor windlass as installed on the motor bay tankers General and Richlube recently built by the Bethlehem Shipbuilding Corporation, San Francisco. These windlasses are of the triple spur gear type, neat in design, of ample strength in all parts to take the strain and shock of the anchor cable, and capable of handling the cable and anchors with speed and efficiency. They are driven by Westinghouse motors.

An interesting Cunningham electric auxiliary is the capstan. This, as fitted on the General and Richlube, is of the new extra heavy design, having a cast steel base carrying a cast steel column which extends up inside the barrel and takes the bending stresses off the shaft. This design makes a very stiff and rugged capstan capable of standing enormous strains.

The capstans are fitted with hand bar heads for hand operation and are double geared, giving two speeds and powers. The slow speed gearing is of the planetary type fitted in the skirt of the capstan barrel and it is brought into play automatically by reversing the motor. As the capstan barrel always revolves in the same direction, this arrangement makes it possible to take up the slack line quickly in high speed gear and exert a maximum strain by simply reversing the motor without disturbing the line or losing any ground. The drive is a 10-horsepower 30 minute rated motor and is self-contained, the motor being mounted on the capstan base.

Cunningham also furnished the complete steering equipment for the General and the Richlube. This consists of a drum type straight electric steering gear driven by a 5-horsepower motor with automatic limit switches and electric helm angle indicators. The electric steering gears are of the non-follow-up type and are controlled by master switches mounted on brass steering columns in the pilot house. Electric steering gears operate in a purchase with Cunningham geared drum type hand steering gears.

The hand steering gears consist of double A frames with drums grooved for wire rope and a spur geared reduction between the wheel and the drum. The hand gears are all bronze and are fitted with a locking pin which locks them securely when the power gear is in use. If, for any reason, the electric steering gear should fail, hand steering can be resorted to instantly by merely pulling out the locking pin of the hand steering gear and proceeding to steer by hand without any change whatever in the electric steering gear. This arrangement of the hand and power steering gears makes such a simple and fool-proof installation that it is becoming very popular. This system is built in all sizes and finds a very ready sale for installation on the new diesel powered vessels building along the Pacific Coast.


The Cunningham electric windlass, as installed on the bay tankers General and Richlube.

Other California jobs recently completed include electric and hand steering gears for the new Golden Gate ferry boat, which are also of the drum type, operating on the same principal as the steering gears furnished for the Richlube and General; also, electric and hand steering gears and electric capstans and warping winches for the new diesel-electric tugs now being completed for the account of the Wilmington Transportation Company at Wilmington, California.

All of the above vessels are fitted with Cunningham air whistles, which are finding very wide application, both on the Pacific Coast and on the Atlantic Coast.

Cunningham has also recently furnished a large amount of electric and hand power anchor windlasses, steering gears, and winches for numerous yachts and tugs and workboats of all descriptions in all the Californian ports. The yacht jobs include the new schooner yacht which William Muller is now completing for Mr. Valentine at Wilmington, and the high speed cruiser now building at the yard of George Twigg & Son, San Francisco, for H. O. Harrison. Both of these vessels are being fitted with Cunningham electric anchor windlasses, hand power steering gears, and boat hoists, whistles, and other equipment of a like nature.

Doors That Do Not Warp

The warping of wooden doors, particularly those exposed to the weather, is a problem that faces all marine operators. Frequent planing of doors to make them fit is considered a regular part of maintaining the vessel.

Solid steel doors will, of course, eliminate this trouble but their weight and cost make them practically prohibitive. The advantages of both wood and steel for such doors have been combined in the material marketed under the name of Plymetl. This consists of a core of plywood and a thin sheet of steel on both surfaces, the plies being cemented together with a secret process, blood albumen glue which prevents their separation even under the severe conditions to which such doors are exposed.

Mr. W. L. Mercerau, superintendent of steamships, Pere Marquette Railroad, Ludington, Michigan, who has had experience with this type of door in the steamer Pere Marquette 21 says: "These doors have not been effected in the slightest by weather conditions and are as tight as when installed, whereas, it has been necessary to plane off the wooden doors a couple of times and some of them are quite badly warped."

This material is now being used on all exterior doors on the two car ferries under construction for the Grand Trunk Railway by the Manitowoc Shipbuilding Company. In addition to the Plymetl in these two ferries, 30,000 square feet of Haskelite, the water proof plywood, will be used for bulkheads, interior side linings, ceilings, and interior door paneling.

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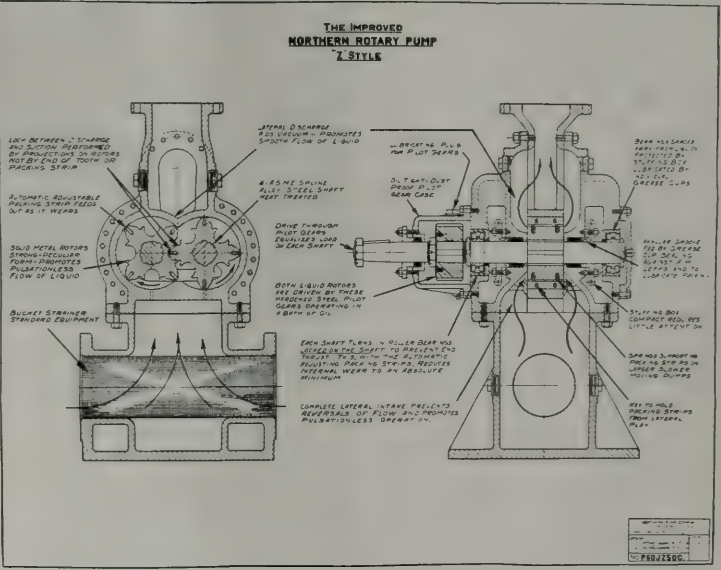
Improved Northern Rotary Pump

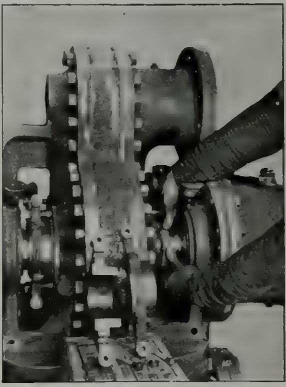

THE IMPROVED
NORTHERN ROTARY PUMP
"Z" STYLE
LOCK BETWEEN DISCHARGE AND SUCTION PERFORMED BY PROJECTIONS ON ROTORS NOT BY END OF TOOTH OR PACKING STRIP
LATERAL DISCHARGE AIDS VACUUM - PROMOTES SMOOTH FLOW OF LIQUID
AUTOMATIC ADJUSTABLE PACKING STRIP FEEDS OUT AS IT WEARS
4-A.S.M.E. SPLINE ALLOY STEEL SHAFT HEAT TREATED
SOLID METAL ROTORS STRONG-PECULIAR FORM-PROMOTES PULSATIONLESS FLOW OF LIQUID
DRIVE THROUGH PILOT GEARS EQUALIZES LOAD ON EACH SHAFT
BOTH LIQUID ROTORS ARE DRIVEN BY THESE HARDENED STEEL PILOT GEARS OPERATING IN A BATH OF OIL
BUCKET STRAINER STANDARD EQUIPMENT
EACH SHAFT TURNS IN ROLLER BEARINGS LOCKED ON THE SHAFT TO PREVENT END THRUST. THIS, WITH THE AUTOMATIC ADJUSTING PACKING STRIPS, REDUCES INTERNAL WEAR TO AN ABSOLUTE MINIMUM
COMPLETE LATERAL INTAKE PREVENTS REVERSALS OF FLOW AND PROMOTES PULSATIONLESS OPERATION.
LUBRICATING PLUG FOR PILOT GEARS
OIL TIGHT-DUST PROOF PILOT GEAR CASE
BEARINGS SPACED AWAY FROM LIQUID PROTECTED BY STUFFING BOX LUBRICATED BY
GREASE CUPS
ANNULAR GROOVE FED BY GREASE CUP SEALING AGAINST AIR LEAKS AND TO LUBRICATE PACKING.
STUFFING BOX COMPACT REQUIRES LITTLE ATTENTION
SPRINGS SUPPORT THE PACKING STRIPS ON LARGER SLOWER MOVING PUMPS
KEY TO HOLD PACKING STRIPS FROM LATERAL PLAY
P60JZ50C

As a result of studies, both in the factory and in the field, the Northern Pump Company have brought out the Improved Northern Rotary Pump, which contains many features suggested by the operating engineers both of marine and commercial installations. These suggestions, together with the constant research going on at their factory, have developed a piece of equipment as nearly perfect as is mechanically possible, and one which will adequately meet the demand for a rugged, compact rotary pump, such as is needed for marine work.

The ability of the Northern Rotary Pump to handle liquids of varying viscosities with practically no change in efficiency has been retained together with all of the other advantages. The improvements lie mainly along the lines of greater security and are obtained by the elimination of all possible sources of trouble and by the incorporation of better facilities for operating and maintaining the pump itself.

The drive shaft now enters the pump on the pilot-gear side of the casing so that an equal load is carried by each shaft assuring the maintainance of clearances between the rotors, and giving much quieter and smoother operation.

Roller bearings are locked on the shafts, preventing end thrust and eliminating wear on the sides of the rotors and pump heads. The packing strips in the ends of the rotor teeth have been retained, their function being similar to that of piston rings in an internal combustion engine. With these two features internal wear is cut down to a minimum. The screen built into the suction base is standard with all pumps and eliminates the necessity of providing the ordinary bulky and costly pot-type of strainer. Since the suction base is provided with a blind flange on one side, the strainer is readily accessible at all times without disturbing the piping or dismantling the pump.


A simple split gland with plenty of hand room makes repacking an easy job on the improved Northern rotary pump

Stuffing boxes are of the simple split gland type with plenty of room all round the shaft for the operator's hands making the repacking a simple and easy job which can be done in a short time. No special wrenches are required as there are only two standard bolts on each box.

The patented lateral intake and discharge ports give the high efficiency which means savings in horsepower and the shape of the cams insures a smooth flow free from pulsations. Coupled with its compactness and sturdiness, its ability to draft liquids without priming and to handle heavy or refined oils or water with equal facility makes the Improved Northern Rotary ideally suited to marine pumping service embodying as it does many suggestions advanced by engineers in the marine field.

New Yale Elevating Platform Truck

The Yale & Towne Mfg. Co. of Stamford, Connecticut, has recently brought out a new elevating platform truck which is designated as the Yale K23E.

This truck is designed primarily to carry the unusually heavy loads that are found in many industries. Although this machine is not of the high lift type, such as the Yale K22, it does embody the desirable self-loading feature. It has so many intra-plant applications that a simple arrangement of the movement of materials will keep it working constantly. The time taken to pick up or drop a skid with this truck, as compared with the time required to load other types of trucks, is very small and as a result it is capable of much greater tonnage per day.

The short turning radius and the narrow width of this machine makes it easy to drive in and out of box cars or narrow aisles. Hardened steel steering pivots with bronze bushings and the high pressure lubricating system reduce friction and make steering easy, even when carrying a full load. This easy steering may also be attributed to large tires, both front and rear, which will not squelch out under load, and to a proper distribution of load on the tires.

Heavy pressed steel frame members and unusually large elevating links, which support the platform, admit of its carrying its load with an ample factor of safety. The links are wide and heavy, giving secure support to the platform.

The triple spur gear elevating mechanism consists essentially of the same unit as is used in the K22 truck, making the major replacement parts interchangeable between models. The elevating platform is raised by means of two large eccentrics mounted on the hoist unit shaft, which draw the platform forward and upward on the platform links. Mechanical upper and lower limit stops assure simple and safe operation of the lift mechanism. The quick speed of elevating will save considerable time during a day's run.

One of the notable achievements of the Yale K series of trucks is the spur-geared unit power axle — a sub-assembly, interchangeable with that used in all of the models. Totally enclosed alloy steel gears, mounted on ball bearings and running in oil, insure long life. The universal joints of the unit are enclosed in leather boots packed with grease, completely protecting them from dirt and water. Accessibility and simplicity of construction decrease overhaul and maintenance expense.

The control of this truck—simple, positive and direct in connecting the operator with the operating part—follows the Yale standards of safety and is another sub-assembly interchangeable with that of all other K type trucks. The controller used is the same Yale designed and built controller used on all Yale industrial trucks. It is durable and highly efficient under the most severe working conditions.

The Yale K23E elevating platform truck picking up a load in a stock room.

The majority of parts, units, and sub-assemblies of the Yale K23E elevating platform truck are standard and interchangeable with those of all other models in the K series. When two or more different Yale K series trucks are used in one plant, this interchangeability offers definite operating advantages and economies. Because of this interchangeability, considerable economy in truck manufacture is effected, thus establishing new standards of value in industrial truck transportation.

A New and Novel Baffle Wall

A NOVEL baffle wall construction known as the Beco baffle wall is now being manufactured, marketed, and installed by the Boiler Engineering Company, 931 Federal Trust Building, Newark, New Jersey. It does away entirely with tiling and is claimed to be better than monolithic or any other construction of baffle walls.

In this wall a simple, continuous strip of corrugated metal is placed diagonally. This construction is applicable to any kind of water-tube boiler. The strip of corrugated metal separates the plastic refractory material into layers. This method is already recognized by many prominent boiler experts as being the simplest and best baffle wall construction in existence.

The principal objection to monolithic construction is that it is inflexible. If proper provision is not made for expansion and contraction, the result is the same as in monolithic sidewalks and roads—cracking is inevitable. Therefore, for the same reason that joints are placed in concrete sidewalks, there should be flexible joints in boiler baffle walls. At the same time, those joints must not only be sliding joints but they must be gas-tight.

The manufacturers state that their joint is ideal because it has a low coefficient of friction; consequently it does not resist expansion or contraction. There can be no cracking or breaking and perfect flexibility is always assured.

Also it is claimed that it is impossible for gases to get through a Beco wall. The corrugated joint is a perfect sliding joint and the tubes are completely mortared into the plastic layers. There is no opening anywhere for leakage. Unless a baffle wall is gas-tight, the gases will short-circuit from one pass to another and power is consequently lost. By absolutely eliminating short circuits and compelling all of the gases to go through every pass, maximum heat is extracted and minimum stack temperature results. If a boiler is compelled to absorb more heat out of every pound of coal the capacity of the boiler is consequently increased.

In addition to the above, the construction is rugged and long-lived. It stands the knocks of tube cleaners better than any other type of baffle wall and being in contact with the comparatively cool boiler tubes these walls are protected against excessive temperatures. Therefore, along with their perfect expansion joints they last indefinitely.

Baffle walls of this type may be installed at any angle. As is well known by all boiler authorities, angular design of this kind is advisable if the highest boiler efficiency is wanted.

Boiler tubes passing through the Beco wall are easily removed and replaced without injury to either the tubes or the wall.

It is important in modern boiler furnaces that sufficient and proper draft drop be obtained. This baffle being absolutely gas-tight, regardless of the type of boiler or angle of baffle, the correct draft drop is always assured.

Another very important item is that the perfectly flexible joints relieve underlying and surrounding brickwork of all stress. Furnace lining repairs are reduced materially because of increased furnace volume created by the inclined baffle. It is common knowledge, these days, that ample furnace volume is highly important. Therefore greater furnace combustion becomes possible and, as a result, we have less soot and slag.

This type of baffle is applicable to any water-tube boiler, horizontal or vertical. The manufacturers claim that owing to the fuel savings created by them, Beco baffles pay for themselves in a very short time.

Beaver Adopts Joes Gears

After extensive tests, the Beaver Manufacturing Company, Milwaukee, has decided to adopt Joes gear as standard equipment on their full line of heavy marine motors because of the excellent results they have had with this gear on their smaller motors. They are enthusiastic over the perfect balance of Joes gear for driving forward at considerable speed and because of the fact that it will reverse at the full power of the motor without racing—the reverse of all these gears being 88 per cent of engine speed.

Hunt-Spiller Gun Iron

As pressures were increased in operating steam engines, and especially when superheat was adopted, it was found that ordinary cast iron piston rings would not hold up. A harder kind had to be made. Then when the internal combustion engine came into use, this problem of rings that would last and still not cut the cylinder walls again became serious. As all engineers know, these rings must be of sufficient flexibility to keep close to the surface over which they slide; they must be of a texture that will take a smooth surface; and, above all, they must resist high heat action and at the same time retain the qualities necessary for long and severe service. Hundreds of types and forms of rings have been made. Some manufacturers produced excellent articles; but unless the basic material was of the highest sort, the results were not up to what is demanded by the owner and operator.

The Hunt-Spiller gun iron rings are said to have solved the vexatious problem. This material, made by the Hunt-Spiller Manufacturing Corporation of South Boston, Massachusetts, is the result of years of careful research by the chemical and metallurgical engineers of the firm. Exhaustive studies of different kinds of iron, its refining and heat treating methods, and the best way to melt and cast it have been thoroughly made. The result is believed to be the highest yet obtained. The metal turned out by this company is used not only in rings, but in cylinder liners. These can also be ordered from the makers, the liners and rings being made with just that bit of difference that saves undue wear on the big liner but makes for long service on the part of the comparatively easily renewed rings. Probably engineers interested would do well to look into this latest product. As a specially made article is generally superior, it follows the Hunt-Spiller gun iron should be so.

Gun iron cylinder linings cast by Hunt-Spiller Manufacturing Corporation for Sun-Doxford engines, built by the Sun Shipbuilding Company

Test of Large Welded Trusses

A series of four roof trusses was tested to destruction at the engineering laboratory of The Linde Air Products Company, Buffalo, during the week of May 10; the culmination of a year's intensive study of the proper application of oxy-acetylene welding to the fabrication of steel structures.

As a first step, studies were made of various types of joints in various kinds of steel shapes. A few of the most promising schemes were then built into typical truss intersections, and proper jigs built to load these joints to destruction. Unit stresses for weld metal in tension, compression and shear were determined by this means. The variety of joint known as the "plate insert joint" was shown to have marked advantages.

Next a 40-foot roof truss was designed and built of conventional angle-iron sections, using the information gained by this preliminary work. In testing, very elaborate framework was necessary to give the upper chord of the truss the lateral support it would receive when placed in a building. Platforms were hung from each panel point and loaded with pig iron.

At definite increments of load the stresses in each member were measured by an extensometer. At double the design load, each welded joint was vigorously pounded with a heavy hammer. At 3½ times the design load, the truss failed by buckling in the upper chord. No distress at any welded joint was in evidence. At the time of failure the truss designed for 21,000 pounds load was carrying 75,000 pounds of pig iron.

Having thus demonstrated the soundness of the underlying methods, four trusses were prepared for comparative test. One was designed and built by a leading structural shop; another was welded by the Linde company, using members of the same size from the same mill rolling; the third was designed to have the same strength as the riveted truss, but since the oxy-acetylene welded joint allows a better placement of the metal, it was materially lighter in weight. A fourth truss was welded of tubular sections.

A summary of the final result follows:

Style	Weight	Total Load at Failure
Riveted Truss...	1161 lbs	62,000 lbs.
Welded Truss of equal weight	1150 lbs.	72,000 lbs.
Welded Truss of lighter wt.	1079 lbs.	70,000 lbs.
Welded Truss of tubular sec.	916 lbs.	63,000 lbs.

All trusses failed by buckling of the top chord, a compression member. In no instance were there any signs of distress at a joint.

These tests were made under observation of engineers from the Pittsburgh Testing Laboratory and in the presence of several independent observers and representatives of governmental departments. More detailed results will be available as soon as the formal report is made by the Pittsburgh Testing Laboratory.

Trade Literature

New Handbook for Wire Rope Users. How to measure wire rope—how to and how not to uncoil or unreel wire rope—how to make an endless splice—how to properly seize rope—how to correctly socket wire rope—how to care for wire rope when both in and out of service—are just a few of the things told in the new 88-page handbook on wire rope recently issued by the **American Cable Company**, New York.

In addition to such information, there is shown by detailed drawings, the best methods for making equalizing slings, bridle slings, and other miscellaneous sling and fitting equipment.

A copy of this handbook is to be had by addressing the publishers of this magazine.

Direct-Injection Oil Engines for All Purposes is the title of a publication just issued by the **Ingersoll-Rand Company**, New York. The cover, printed in colors, illustrates Ingersoll-Rand oil engines as applied to railway, marine, power-house, industrial, and building applications.

The text matter, which consists of technical data and details of their "PO" oil engines of 55, 110, and 150 brake horsepower sizes, is profusely illustrated by 42 illustrations of plant layouts, installation views, diagrams, and engine details.

A copy of this publication is available to executives and engineers on request by addressing the Ingersoll-Rand Company, 11 Broadway, New York, or any of their representatives in the principal cities of the United States and all foreign countries.

Sperry Steering Gear for Conversion Program

NOW that electricity has been found to have so many advantages over steam for driving auxiliaries aboard ship, operators are rapidly adopting it. The substitution of electricity for steam is even more marked where diesel conversions and new motor tonnage are concerned. In the case of the Shipping Board conversion program now under way, a great deal of study was given to this subject by the technical staff of the Shipping Board headed by Mr. H. E. Brelsford, and it was found possible to utilize a large part of the old steering engine equipment thus saving a number of thousand dollars per ship. An electric motor will be substituted for the steam steering engine proper, and in the case of most of the ships no alterations to the screw gear or tiller will be necessary.

The Sperry Company has helped in this program by developing a special Gyro-Pilot and Dual Electric Steering System for these vessels. This equipment provides three methods of steering and a change from one to the other may be made at will by simply moving a lever mounted on the side of the steering stand to whatever method of steering is desired. The three lever positions are marked "Gyro," "Wheel" and "Controller."

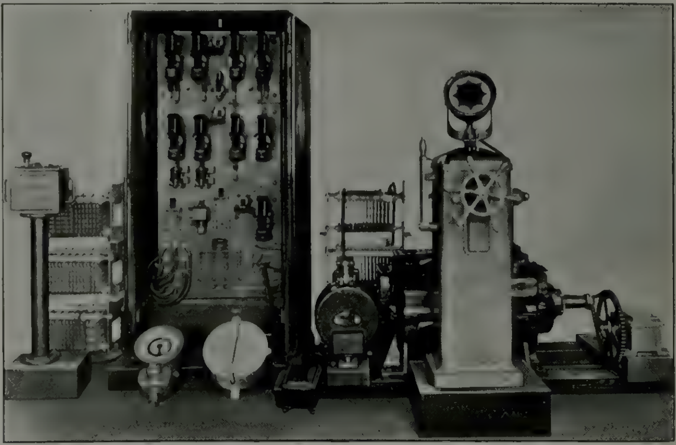
With the lever in "Gyro" position, the ship is steered automatically from the Gyro-Compass. In other words, "Metal Mike" takes his continuous trick at the wheel. This system of automatic steering is the same as is incorporated in the standard single unit Gyro-Pilot now used on over one hundred vessels of all types throughout the world. When steering automatically, the wheel on the control unit then becomes a course changer. For example, if it is desired to change the course to starboard, one spoke change of the control wheel gives a one-half degree change to starboard, or each full turn of the control wheel gives a change in course of about three degrees, and so on. It is, therefore, unnecessary to put a man at the steering wheel when making changes for another vessel or for great circle or other course changes.

When it is desired to bring the ship under control of a helmsman, the selector lever is moved to "Wheel" and the steering wheel functions just as any ship's steering wheel and with the usual ratio of three and one-half turns from midships to hardover.

The "Controller" method of steering is not dissimilar to the system used throughout the U. S. Navy. A controller handle is attached to a square ended shaft protruding through the top of the steering stand. When this controller is in the center position, the steering motor is idle. When it is moved to one side, the steering motor is started and remains running until the controller is brought to the central position or until the rudder is hardover. Bringing the controller back to the central position stops the steering motor. To bring the rudder back amidships it is necessary to move the controller to the opposite side for a corresponding length of time. In other words, this method provides what is known as non-follow-up steering and is accomplished through circuits which are entirely independent of those used for "Wheel" and "Gyro" steering.

Both the Gyro-Pilot Dual Electric Steering Control and the main steering motor operate from 230 volts, which is the normal voltage for these ships.

A Sperry self-synchronous Rudder Angle Indicator, operating from this same voltage, is also being supplied as part of the steering system. An indicator in the wheelhouse and after steering position shows every degree movement of the rudder up to ten degrees on a side and every five degrees thereafter. This instrumnt is of great value in helping the officer choose a setting of the Gyro-Pilot which will hold the ship with a minimum amount of rudder.


The several units supplied by the Sperry Gyroscope Company for each motorship of the conversion program of the United States Shipping Board. This equipment provides for automatic gyro-compass steering.

* * *

New Electric Cargo Winch

THE engineers of the General Electric Company have for years been studying the handling of freight aboard ships. To this end, they have worked with numerous ship owners and operators, and representatives of the company have studied the problem in many ports.

From the wealth of data and experience thus obtained, a new principle in electric cargo winch design has recently been developed and demonstrated, based on the demand of all operators to cut the time of handling cargo to a minimum. To do this means:

1. High tonnage capacity with minimum consumption of current.
2. Extreme reliability, i. e., durability and simplicity.
3. Fool-proof control.

Taking these points in the order given:

High tonnage capacity means high rope speed hoisting and lowering, also quick handling in the hold and ashore; so that the skill of the stevedores in getting the loads to and from the hook will be the only limit. The loads or drafts of general cargo rarely exceed 6000 pounds with an average of 500 to 3000 pounds. A mean figure is 1500 to 2000 pounds. Heavier loads up to 30 tons are met with, but special means are providing for handling them.

What is the hardest duty for a winch? The point of maximum tonnage. This is not heavy loads which are clumsy to handle in the hold and ashore, but small light loads which are handled easier and faster, resulting in many more trips per hour at high speed. For example, with 5000 pounds, about 16 trips and 40 tons per hour are possible, and with 2000 pounds, 75 trips and 75 tons per hour are possible.

The General Electric Company has developed a winch to handle maximum

(Continued on Page 328)

Marine Insurance

Edited by JAMES A. QUINBY

Another Inchmaree Angle

OF all the umpty thousand clauses, standard or otherwise, that have adorned hull policies from time immemorial, the so-called Inchmaree Clause continues to hold undisputed first place as a source of altercation between the honest (grasping) assured and the scheming (long-suffering) insurer.

The clause has survived the ravages of time and opposition for some thirty-odd years, in spite of periodic attempts to improve upon its wording, and is now found in practically every standard hull policy, reading as follows:

> This insurance also specially to cover (subject to the free of average warranty) loss of, or damage to hull or machinery directly caused by accidents in loading, discharging, or handling cargo, or caused through the negligence of Master, Charterers, Mariners, Engineers, or pilots, or through explosions, bursting of boilers, breakage of shafts, or through any latent defect in the machinery or hull, provided such loss or damage has not resulted from want of due diligence by the Owners of the Ship, or any of them, or by the Manager, Masters, Mates, Engineers, Pilots, or crew not to be considered as part owners within the meaning of this clause should they hold shares in the steamer.

The argument as to coverage has centered almost exclusively about the words "loss of, or damage to hull or machinery.....caused..... through any latent defect in the machinery or hull....." Shipowners, and certain adjusters, have insisted that the loss of the part in which the defect appeared was sufficient to constitute "loss of, or damage to hull or machinery." Insurers, on the other hand, have maintained that there must be resultant damage to other parts of the vessel before the loss is recoverable.

This controversy has formed the basis for a series of well-known cases, such as Hutchins Brothers v. Royal Exchange Assurance Corporation, (The Ellaline,) 2KB 406, Oceanic Steamship Co. v. Faber (The Zealandia), 13 Com. Cases 28 (C. A.), reviewed in Arnould on Marine Insurance, 11th Ed., Par. 861a, and ostensibly followed in the New York case of The Rensselaer, 1925 AMC 1116.

Photo: Courtesy Fireman's Fund Insurance Co.

New Type of Craft

"Oh, Papa,. . See the funny boat. . How did it get that way?"

"Well, Algernon, it may have been tuning up for the pole-vault, or it may have had some slight moisture in the hold, which eventually caused all the gravel on board to rush over to one side to investigate. Then the boat got tired and leaned over on the other boat to rest."

"But, Papa, would the damage be recoverable under a collision policy?"

"There, there, Algy, run along and take your Charleston lesson, and don't bother Papa with such silly questions."

A Latent Defect—What Is It?

Although courts in England and America have handed down numerour decisions on the "resultant damage" angle of the Inchmaree clause, they have apparently not been called upon actually to define a latent defect under the clause. There is nothing peculiar nor technical about the wording. A thing is latent when it cannot be discovered by due diligence, and as this part of the phrase refers entirely to a question of fact in any given case, we may dismiss it as having no place in a general discussion.

The word "defect," however, contains the germ of a difficulty. It comes close to being a term of last analysis. The average man on the street would say "A defect? Why, a defect is a,—a defect—Something wrong." The eminent Mr. Webster describes it is a "want of something necessary for completeness or perfection."....Perfection is a harsh word, Mr. Webster, especially when your subject has a feminine pronoun.

The hull underwriter will have none of these generalizations, but clings to the idea that the type of defect which the clause intended to cover was some definite failure of material, such as a break, a flaw, or an air bubble in an apparently solid piece of metal.

It is submitted that there is no basis for this latter assumption, save in the old adage that the wish is father to the thought. There is no doubt that most machinery claims are predicated upon a flaw or crack in metal, but to argue that all latent defects must have such a flaw is to proceed along a train of thought pointed out as a horrible example by our school logicians—that as all horses are quadrupeds, ergo, all quadrupeds are horses.

On the other hand, if a "defect" is given its broadest meaning, and admitted to include any deficiency or maladjustment,—any failure to function properly—the underwriter is certainly biting off quite a sizeable mouthful when he writes the Inchmaree Clause into a hull policy, especially on risks having high speed motor propulsion.

One Court's Idea of a Defect.

In the case of the Prussia, 93 Fed. 837, the court upheld the inclusion of a peculiar accident under a "defect" clause

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MARINE DEPARTMENT—*Harry W. Browne, Manager*

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in a bill of lading. As the meaning of such a term would probably be construed strictly against the maker of the document in a bill of lading as well as in an insurance policy, a review of the case may not be out of place in this column.

The Prussia, a cold storage meat carrier, was built in May, 1894 and shortly thereafter was equipped with a duplex refrigerating apparatus, designed to keep her storage rooms below the freezing point. The apparatus was tested by the makers, a reputable concern, and again tested when put into the ship.

The vessel then sailed on her maiden voyage, Belfast to New York via Hamburg, and experienced no difficulty en route, carrying a normal cargo of dressed meat without damage.

On her return trip to Hamburg, when two days out of New York the ice machine failed to function, causing a loss through deterioration of a large quantity of dressed meat. It was found that the failure of the apparatus was due to the presence in a suction pipe of a leather washer, inadvertently left in the machine when it was installed.

The carrier denied liability for the damage, taking refuge behind a clause in the contract of affreightment, which exempted ship from claim for damage resulting from defects in hull or machinery. The District Court handed down a decree in favor of the carrier, upholding the term "defect" in the bill of lading, as applied to the facts presented. In affirming the decision, the Circuit Court of Appeals used the following language:

"We agree with the learned judge who decided the case in the court below that the libelant was not entitled to recover upon the theory that the owners of the Prussia were negligent in providing defective refrigerating apparatus for the purposes of transportation. The apparatus had been constructed by builders of requisite capacity and, after it had become a part of the machinery of the steamship, had been tested by competent experts in the most thorough manner, and found to be perfect. It was new, and had not been used long enough to impair its efficiency, but it had been used sufficiently to demonstrate that it was adequate and apparently in perfect condition.

"It is the duty of the carrier by water, when he offers a vessel for freight, to see that she is in suitable condition to transport her cargo in safety: and he impliedly warrants that this duty has been fulfilled.......But it is competent for the parties, by express contract, to modify the obligations which would otherwise devolve upon the carrier, including even that of providing a seaworthy vessel; and short of any modification which will exempt him from the consequences of his own misconduct or negligence or those for whom he is responsible, such contracts, though strictly construed against the carrier, are given full effect. Among them, one of the most common is that exempting carriers from liability for latent defects in the hull or machinery of the vessels..........

"We conclude that the damage sued for arose in consequence of a latent defect in the refrigerating machinery, that due diligence was exercised by the owner of the steamship to provide suitable and perfect refrigerating machinery, and that by the terms of the Harter Act, as well as irrespective of that act, it is lawful for a vessel owner, who has exercised due diligence in that behalf, to stipulate for exemption from liability arising from such a defect."

The Question of Proof.

If a maladjustment, or the presence of a foreign body in a delicate piece of machinery, can be considered a defect, it is but a step to the assumption that any failure to function is a defect, provided the age of the article does not afford a basis for the wear and tear theory.

And, if any failure is a defect, it will no longer be necessary to prove the exact nature of the failure, but a mere showing of the damage and due examination preceding it, will establish a prima facie case for recovery.

In the Nederland, 7 Fed. 926, a passenger was injured by the shoulder of a swivel drawing out of a block, allowing a boom to fall. There was nothing shown as to the reason for the shoulder pulling out. The swivel was covered by an iron band, so that the defect, if any, could not have been discovered. The court said: "This could only occur by reason of some defect in the shoulder......the defect could not be discovered....."

Admitting that the cases cited above were not brought under the Inchmaree clause, their attitude in defining a latent defect is at least significant.

The Broker's Privilege

The recent case of the Ruby Steamship Corporation v. Johnson & Higgins, reported in 1926 A.M.C. 586, throws additional light on the somewhat anomalous position of the marine insurance broker.

The case recites that Johnson & Higgins, as brokers, had placed hull insurance in London for the owners of the Ruby, the full premium becoming theoretically due upon issuance of the policy, although by custom it was payable quarterly. The London brokers through whom the underwriters were approached were liable for the full premium, and Johnson & Higgins were in turn liable to the London brokers.

Upon this state of facts, Johnson & Higgins retained the policies in their possession, arranging with the assured for regular quarterly payment of premiums. The Ruby Steamship Corporation after repeated promises, failed to pay one of these quarterly premiums. Johnson & Higgins thereupon cancelled the policy and returned it to the underwriters. Shortly thereafter, the vessel became a total loss.

The Ruby Steamship Corporation then sued their brokers for the face amount of the policies, in contract, and also in tort for the conversion of the policies. The District Court directed a verdict for the defendants, commenting on the position of a broker in the following terms:

"......It was held in the House of Lords, in Xenos v. Wickham, L R 2 H L 296, that a marine insurance broker

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is without authority to cancel policies of insurance procured for him by his principal. That case did not involve the rights of a broker arising from the breach of the principal's agreement to pay the broker the premiums for which the broker became liable in procuring the insurance. Pursuant to the English practice, the premium is payable in full upon the issuance of the policy, and the English broker is liable for this payment. The defendant in this case, in procuring the insurance through an English broker, became responsible to him for the payment of premiums upon the faith and in consideration of the plaintiff's promise to pay the premiums in quarterly installments. After ample notice that prompt payment of the quarterly payment due in November would be insisted upon, and that the policies would be cancelled if the payment was not made in time, the plaintiff breached its contract by failing to pay, as it had agreed to do.

"Upon such breach, the defendant was relieved from further performance, and the insurance having been procured upon the defendant's assumption of liability for premiums for the entire term of the insurance, the defendant was entitled to be relieved of such liability insofar as future insurance was concerned.

"With respect to the payment of premiums, the parties were dealing as principals, and upon the plaintiff's material breach of its agreement the defendant was entitled to rescind. So far as it was within the power of the defendant to relieve itself from liability for future insurance, it could act without the aid of a court. Having the policies in its possession, and these policies being issued in the name of the English broker and endorsed in blank, the defendant was entitled to surrender them for cancellation, since this was the only means by which it could be relieved of the payment of premiums upon future insurance.

"The defendant's right of cancellation in this case does not rest upon its original authority, but is incident to the exercise of the right to be relieved of a liability assumed upon the faith and in consideration of the plaintiff's promise, which has been broken.

"The plaintiff is in no position to complain of the defendant's refusal to carry the insurance at its own cost and without payment by the plaintiff as provided in the agreement between the parties. Accordingly the plaintiff has no cause of action either for breach of contract or for conversion of the policies."

C. R. Page Promoted

C. R. Page

HIS many friends on the Pacific Coast and throughout of the country will be glad to know that the Board of Directors of the Fireman's Fund Insurance Company, at a meeting held on May 13, elected Charles R. Page, present manager of the Atlantic Marine Department at New York, to be a vice-president of the company, and that the Directors of the Home Fire & Marine Insurance Company later took similar action.

Mr. Page originally joined the "family" in 1902. He is a native of San Francisco and was born May 24, 1878. From St. Paul's School at Concord, New Hampshire, Mr. Page went to Yale, was graduated in 1900 and travelled extensively in the Orient and in Europe before becoming identified with the Fireman's Fund in 1902. In October, 1917, President Wilson appointed him a member of the Shipping Board, from which he resigned in 1919 and returned to the service of the Fireman's Fund at the end of 1921. Because of his war service while a member of the Shipping Board, Mr. Page was made a Chevalier of the Legion of Honor by the Republic of France.

His father, the late Charles Page, an admiralty lawyer of international distinction, was for many years a director of the Fireman's Fund Insurance Company.

A Nautical Lay

(Apologies to Volstead.)

Where tides of traffic lap the shore
Of California Street
And rolling waves of carmine ink
Bespray the balance sheet,
The Underwriter dreams of risks
And rates that are no more—
He tightens up his shaky lines
And hears the brokers roar.

He minds the days when deals were made
And sealed across the foam,
And derelicts, their decks awash
Were towed in safety home.
He cries, "Alack—The trade is slack
Out where the schooners ply—
How can our line be maritime
When all the bars are dry?"

A Submarine Coupe
Or
The Adventures of a Cool Swede From the Sage Brush State.

SINCE the Sacramento River is soon to become again an important waterway for deep sea ships the following unusual and far from average adjustment report, which was recently filed at the Automobile Department of the Fireman's Fund Insurance Company of San Francisco, should be of interest.

The accident occured near Rio Vista on the Sacramento River. Professor Sigmund Leifson of the University of Nevada was on his way from San Francisco to Reno when his car collided with the abutments on a ferry operated between Sherman Island and the mainland. The driver lost control

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of his machine, which plunged off the ferry into the river. The windows of the car were closed, causing it to sink slowly. When it was about 10 feet below the surface of the water, the professor put up his hat, opened the door, calmly stepped out and floated to the surface, decidedly wet but otherwise showing no ill effects of his unpremeditated plunge. Bystanders report that he came up with his hat on his head and his pipe in his mouth. It is understood, however, that the pipe was not drawing very freely.

With a derrick the car was brought to the surface and when safely landed the salvage crew were amazed to find the clock still running and the headlights burning, although the car had been submerged for about 40 hours in 35 feet of water.

The clock was ten minutes slow.

Freights, Charters, Sales

June 16, 1926.

SINCE our last report the demand for wheat space for United Kingdom has declined, for prompt shipment the rates on liners for June-July being nominally 30/-. Full cargoes for the late summer and fall are fixing at 30/-to 31/3.

The Japan market has also remained quiet with rates on lumber $9 to $9.50 and wheat $4.

Australia has remained quiet with no charters to report and rates quoted for future are $13 on a basis of two loading and two discharging ports.

The intercoastal market remains weak with rates at $10 to $11.

The following steamers have been reported fixed with grain to the United Kingdom/Continent: British steamer Hyson, June, Balfour Guthrie & Company; British steamer Benreoch, 30/-, June; British steamer Beechpark, 30/-, June; British steamer Fernmoor, August/September, Suzuki & Company; British steamer H. H. Asquith, June, same charterers; Swedish steamer Unden, June, Strauss & Company; British steamer Royal City, June; Belgian steamer Menapier, 30/-, June/July; British steamer Skegness, 30/-, August/September, Balfour Guthrie & Company; Swedish steamer Strassa, August, Strauss & Company; British steamer Baron Carnegie, August/September; British steamer Tiberton, August, Balfour Guthrie & Company; British steamer Breaksea Light, 28/9, June/July; Italian steamer Laguna, 26/9, June/July; German steamer Sebara, June.

The American barkentine Forest Friend has been fixed with lumber from Puget Sound to Australia and Noumea by J. J. Moore & Company.

For lumber to the Orient the following steamers are reported: Japanese steamer Rozan Maru, Japan, June, Nakagawa & Company; Norwegian steamer Storviken, Shanghai, two trips, July, Pacific Export Lumber Company; British steamer Skegness, Japan/China, $1.90, prompt; American steamer Eastern Knight, Shanghai, Dant & Russell; Japanese steamer Shunsho Maru, Japan, July, Yamashita Company; Japanese steamer Tohkoh, Japan, July, Yamashita Company; Japanese steamer Koshin Maru, $9.50, July, H. F. Ostrander.

The Norwegian motorship Marie Bakke is reported fixed with lumber from Noyo and Puget Sound to Mollendo and Callao, June loading, by Balfour Guthrie & Company.

The following steamers are reported fixed with lumber to the Atlantic seaboard: American steamer Herman Frasch, Columbia River and Puget Sound to North of Hatteras; American steamer Onondaga, Grays Harbor to New York, $10.50, Pacific Lumber Agency; Italian steamer Burma, British Columbia to New York, June, Canadian American Shipping Company.

The American tanker Albert E. Watts has been reported fixed from California to Philadelphia, crude oil, 86c, June loading.

The following time charters are reported: British steamer Sheafmead, 7 to 9 months, delivery San Pedro, redelivery China, Japan or Australia, $1, June/July; British steamer Atlantic City, Pacific Trade, 5 to 6 months, delivery North Pacific, end July, $1.15; British steamer Dunaff Head, delivery Puget Sound, redelivery St. Lawrence, $1, H. R. MacMillan Export Company, July; Norwegian motorship Christian Knudsen, one year, $1.27½, delivery San Pedro, redelivery North of Hatteras, option Australia, by H. R. MacMillan Export Company, July.

The following sales are reported: American barkentine Hawaii, Hind Rolph & Company to W. E. Harned, Seattle, $6000; American barkentine Jane L. Stanford, The Robert Dollar Company to Chas. McCarthy; American ship Santa Clara, Alaska Packers Association to a moving picture company of Los Angeles; American schooner W. F. Jewett, Wilvers & McCarthy to John West.

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New Electric Cargo Winch

(Continued from Page 322)

tonnage of average loads (1500 to 2000 pounds) and with capacity to lift 8000 pounds on a single whip, if required.

In this development, unusual as it may seem, high speed and low power consumption have been obtained by slowing down the motor. This has greatly reduced the surges (peaks) of current in accelerating the motor and load. The peaks are there, theoretically of course, but they are so rapid that they will not register on an ammeter.

Reliability—A typical winch consists of a water-tight motor and brake, a drum and a single gear reduction totally enclosed and running in oil. Simplicity means reliability and safety.

Fool-proof Control—An unskilled laborer can operate this winch with the facility of a trained stevedore after a half-hour's practice.

These winches are installed and operating successfully on The Ford Motor Company's motorship East Indian and have been selected for the International Mercantile Marine Company's new liner, now building.

A number of winch manufacturers are prepared to furnish on request these equipments.

Full technical data and information will be furnished by the Federal and Marine Department, General Electric Company, Schenectady, N. Y., or the nearest sales office of the company.

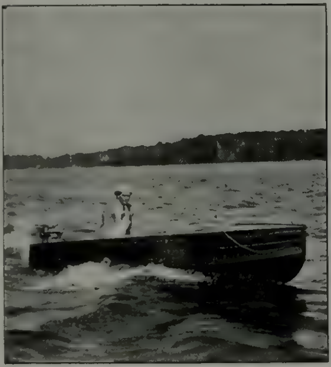
New Underwater Electric Arc Cutting Equipment

THE employment of an underwater cutting torch is not new, as for several years past they have been used. However, it remained for the Merritt, Chapman & Scott Corporation of world-wide reputation to develop the electric oxygen torch to its present high efficiency in marine salvage work. To bring about this result considerable research and experiment had to be done. Under the direction of the company's engineers, a large tank was built in their shops. This was fitted with portholes closed by glass, through which the actual action of the flame when under water could be observed. The diver was then working under the same conditions as would exist in a real salvage job. Corrections in the action of the torch were easily made, and the results obtained culminated in a tool whose capabilities are away ahead of former methods.

Formerly, when masses of twisted steel were to be cut away from a sunken wreck, dynamite was used. This was risky in many ways, as the shock of explosion might do more extensive damage. This was the prime reason of the employment of the under-water flame, generated by the electric arc protected by an oxygen bubble.

So far this method has not been used on the Pacific Coast, but the Merritt, Chapman & Scott Corporation have been urged by their Pacific Coast representatives to send out to the San Pedro offices a complete installation. It is expected this will be here in the near future, and available for business. When here Pacific Marine Review will publish a more lengthy description of the process, as such will be of great interest. Underwriters will no doubt welcome the arrival of such a splendid adjunct to the salvage equipment of Merritt, Chapman & Scott.

S. V. B. Miller and the Super Elto



An Elto Booster

S. V. B. MILLER of Seattle, distributor of the Super Elto in western Washington and Alaska, recently visited the Elto Outboard Motor Company at Milwaukee. Mr. Miller is probably one of the best known men in the marine trade on the Coast, having built up a large volume of business and an enviable reputation for fair dealing.

The accompanying photographs show Mr. Miller at leisure and also in action trying out the Super Elto on different types of boats. He was most enthusiastic over the results of his tests and expressed the belief that he would double his last year's sales record on the Super Elto this year.

Malolo Gymnasium Equipment

SEVERAL unique health-building appliances will be installed by A. G. Spalding & Bros., Chicopee, Massachusetts, in the up-to-date gymnasium of the Malolo. Among them is the Battle Creek Health Horse which has become internationally famous since President Coolidge adopted this form of exercise in the White House. The speed is controlled with a dial directly in front of the saddle and the appliance can be adjusted to three different gaits-trot, canter, or gallop.

Another appliance called the Battle Creek Health Builder, which gives massage to all parts of the body, is also included in the equipment. This appliance is also electric driven and several different kinds of applicators may be used with it.

Still another device to be installed is the Battle Creek Vibratory Chair, which is one of the most effective appliances ever invented for stimulating circulation of the blood. It is claimed that ten or fifteen minutes spent in the Vibratory Chair will relieve fatigue and nerve weariness. It is also beneficial in cases of nausea.

These three Battle Creek appliances will undoubtedly prove very popular with ocean travelers who sail on the Malolo. Many other pieces of Spalding standard gymnasium apparatus are included.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

DIESEL-ELECTRIC FERRIES FOR SOUTHERN PACIFIC.

Contract has not yet been awarded by the Southern Pacific Company, San Francisco, for the construction of three and possibly five vehicular ferryboats for San Francisco Bay service. The boats are to be of diesel-electric, screw propulsion, and it is estimated will cost in the neighborhood of $525,000 each. Bids were asked from California shipbuilders.

The new boats will be of steel construction and have a capacity for 80 automobiles. Provision is made for comfortable seating of 500 passengers and a dining room to serve 50 persons at one time.

The boats will have a 256 foot length over-all, and beam of 44 feet 10 inches. Hull will have 19 feet 9 inch depth at center. Draft will be 11 feet 3 inches. Displacement is 1700 tons. They will be diesel-electric driven with 1600 shaft horsepower.

The company plans, in addition to the ferryboats, improvement of their facilities by the construction of a third slip at the Oakland pier, and the improvement of the San Francisco vehicular ferry terminal. They have also announced that they will extend their vehicular ferry service to Alameda. The total cost of ferry service improvements is stated by F. L. Burckhalter, first assistant general manager, to be $1,750,000. Charles Green, at the West Oakland Shipyard, is architect and engineer of the San Francisco ferry service.

BIDS CALLED FOR RECONDITIONING S. S. AMERICA.

Plans and specifications have been issued by the United States Lines, 45 Broadway, New York, for reconditioning and restoring the steamer America, now lying at the yard of the Newport News Shipbuilding & Dry Dock Company, to the arrangement and condition existing before the fire on March 10.

The America was damaged very extensively. The area effected runs from frame 50 to frame 205, covering 56 per cent of the total length of the vessel in the central portion where the fire did great damage, practically destroying all the interior finish and fittings of the first class cabin accommodations. The job of reconditioning and restoration will be almost equal to the original reconditioning contract, and there will be in addition a considerable amount of hull repairs.

Bids for reconditioning the liner America were: Newport News, $1,770,000 in 250 days; Morse Dry Dock, $1,998,000 in 255 days; Robins Dry Dock, $2,275,000 in 300 days; Tietjen & Lang, $2,342,000 in 312 days; Bethlehem, $2,150,000 in 310 days. Specifications and plans have been prepared for three separate contracts; namely, repairs, renewals, and reconditioning; drydocking and underwater work; and reconditioning and outfitting of cabins and public rooms together with certain fixed furniture and furnishings of specified rooms.

Separate specifications have been issued also for portable furniture and carpets. Specifications were prepared under the supervision of Naval Architect Carl E. Petersen at the Norfolk Army Base.

COVERED BARGE FOR S. F. BAY.

Hibbs, McCauley & Smith, naval architects and marine engineers, 311 California Street, San Francisco, are preparing plans for a covered bay barge for the Bay Cities Transportation Company, to be equipped with a Barlow patent elevator for freight handling.

CONTRACT № MVC-

TSS. "MOUNT VERNON".

SPECIFICATIONS FOR REPAIRS RENEWALS, RECONDITIONING, AND ALTERATIONS, TO CONVERT THE VESSEL FOR CABIN, TOURIST, AND 3RD CLASS PASSENGER, AND CARGO SERVICE.

SERIAL №

The reconditioning of the two steamships Mount Vernon and America for the United States Lines by the Emergency Fleet Corporation represent an expenditure of several million dollars.

GOLDEN GATE FERRIES MAY BUILD ADDITIONAL BOATS.

The present trend of the hearing now under way before the California State Railway Commission, San Francisco, indicates that permission will be granted the Golden Gate Ferry Company to operate vehicular ferry service between the foot of Hyde Street, San Francisco, and the city of Berkeley. The General Engineering & Drydock Company, Oakland, California, are now completing the first of three ferryboats contracted for this service, and a favorable decision of the Railroad Commission will necessitate the building of the other two ferries, construction of which has been held pending the final decision of the Commission.

BIDS FOR RECONDITIONING S. S. MOUNT VERNON.

Bids were opened by T. H. Rossbottom, General Manager, United States Lines, 45 Broadway, New York, on June 8 for the reconditioning of the steamship Mount Vernon for operation alongside the steamship Leviathan of the United States Lines.

Under the specifications issued by the United States Shipping Board staff of engineers, under the supervision of Carl E. Petersen, naval architect, accommodations will be provided for 1290 passengers and 588 in crew. There will be two classes—cabin and tourist.

When reconditioned, the Mount Vernon will have six single-ended and six double-ended coal burning boilers and her engines will develop 22,000 indicated horsepower. She will have a normal sea speed of 18 knots.

Bids were submitted as follows for reconditioning work:

Tietjen & Lang Plant, Todd Shipyards Corp., $2,790,170 and 295 days;

Newport News Shipbuilding & Drydock Co., $3,100,000 and 310 days;

New York Navy Yard, $4,109,338 and completion date of February 28, 1927.

Bids for dry-docking and underwater work were:

Boston Navy Yard, $55,000;

New York Navy Yard, $15,983;

Norfolk Navy Yard, $15,335;

Newport News Shipbuilding & Drydock Co., $105,000.

Separate bids for furnishing of public rooms were submitted by—

William Baumgarten, New York, alternate bids of $138,000 and 146,000 depending on location of vessel;

John C. Knipp & Son, Baltimore, $143,081;

Tietjen & Lang Plant, $146,600.

Bids for furnishing beds and sofa berths:

Tietjen & Lang Plant, $54,980;
John C. Knipp & Son, $53,375;
Ren Cabinet & Linoleum Co., $49,875.

Considering the bids for reconditioning the Mount Vernon too high, the Shipping Board is studying reduction in the work to be done to bring the cost nearer the $2,000,000 mark.

THREE COAST GUARD CUTTERS TO BE BUILT.

President Coolidge has signed the authorization bill for the construction of ten Coast Guard cutters. The entire amount of funds for the construction of cutters has not yet been appropriated; but they are estimated to cost an aggregate of $9,000,000. Several of them will probably be built on the Pacific Coast.

An announcement has been made by the Coast Guard Service that the Director of the Budget has approved the expenditure this year of $1,000,000 of this fund, which should be sufficient to start construction of three cutters, the Director authorizing the incurring of contractural obligations up to $1,700,000.

THREE FREIGHTERS FOR UNITED FRUIT CO.

One of the largest jobs in prospect for American shipyards at the present time is the construction of three vessels for the United Fruit Company. This company announces that they will build nine ships, six in foreign yards and three in the United States. The latter are to be of about 5000 tons deadweight, with a speed of 15 knots, and will be equipped with special refrigerating machinery to take care of the perishable cargoes carried by the line.

It is reported that bids will be asked on reciprocating steam engines and diesel engines, and the vessels will cost from $1,000,000 to $1,750,000 each.

OIL TANKERS TO BE CONVERTED.

The Atlantic Refining Company, Philadelphia, Pa., has purchased from the United States Shipping Board the tankers Sharon, J. M. Connelly, and Bessemer, each of 7057 deadweight tons, for the sum of $40,000 each "as is" and "where is." According to the contract sale, these boats are to be converted to diesel drive.

The diesel engines will be furnished by the Ingersoll-Rand Company and the electrical equipment will be supplied by the General Electric Company. Each tanker will be equipped with three 850-horsepower diesel engines, each driving a 525-kilowatt, 250-volt generator for propulsion and a 50-kilowatt, 250-volt auxiliary generator for excitation and ship's auxiliary power. The propulsion generators will supply power to an 1800-horsepower, 750-volt double motor to be direct connected to the propeller shaft. The control will be of the Ward-Leonard type arranged for operation either from the pilot house or the engine room.

Auxiliaries will be driven by General Electric motors. These auxiliaries will include two 80-horsepower cargo pumps, one 45-horsepower windlass, one 30-horsepower mooring winch, one 30-horsepower fire and bilge pump, two 15- horsepower air compressors, balancer set and numerous small pumps—as well as a 25-kilowatt auxiliary generator driven by a small oil engine which will be used for emergency and in port.

Larry Knight, San Francisco yachtsman at 343 Front Street, has announced that he is having plans drawn for a 40-foot yawl and will soon be asking bids from boat builders.

SEATTLE FIREBOAT.

Seattle City Council through the Finance Committee has recommended an ordinance to be submitted to the approval of the citizens appropriating between $200,000 and $250,000 for the construction of a new fireboat for Elliott Bay fire hazards.

VESSELS FOR C. G. M. M.

The Canadian Government Merchant Marine has submitted their plans and specifications for the construction of five or six motorships to United Kingdom shipbuilders. Bids were originally asked from Canadian shipbuilders, but no action has been taken on the tenders submitted.

Recent Contracts

The Wm. Cramp & Son Ship & Engine Building Co., Philadelphia, Pa., was awarded contract by the Secretary of the Navy on June 4 for the building of the new light cruiser Salt Lake City complete and for constructing the engine, boilers, and auxiliary machinery for the light cruiser Pensacola, the hull of which is to be built at the New York Navy Yard. Contract price is $10,900,000.

The general dimensions of the Salt Lake City are to be: length over-all, 585 ft. 6 in.; length between perpendiculars, 570 ft; breadth, extreme, 65 ft. 2 in.; displacement, 10,000 tons; normal displacement, 11,568 tons; normal draft, 19 ft. 6½ in.; speed, 32½ knots.

United States Navy Yard, Mare Island, California, has received instructions from the Secretary of the Navy to start construction of the big submarine V-6. The diver will be 350 feet long and will have a speed of 21 knots. This is a sister ship of the V-5, for which estimates are now being completed and which will be built at the Norfolk Navy Yard. Each submarine is to cost $5,000,000.

Mare Island Navy Yard also received instructions on June 2 to proceed with overhauling of four submarines of Division 18 of the Pacific Fleet, which will require six months and cost about $500,000. When this work is completed another $500,000 will be required to overhaul the remainder of this division the first six months of 1927.

American Brown-Boveri Electric Corp., Camden, N. J. has been awarded contract by the U. S. Coast Guard, Washington, D. C., for the construction of 35 patrol boats. The boats are to be 125 feet long, 23 feet 6 inches molded beam, and have a loaded displacement of 220 tons. They will have twin screws and diesel engines developing 300 horsepower, to be supplied by the Coast Guard Service. Deliveries are to range from December 31, 1926 to April 15, 1927.

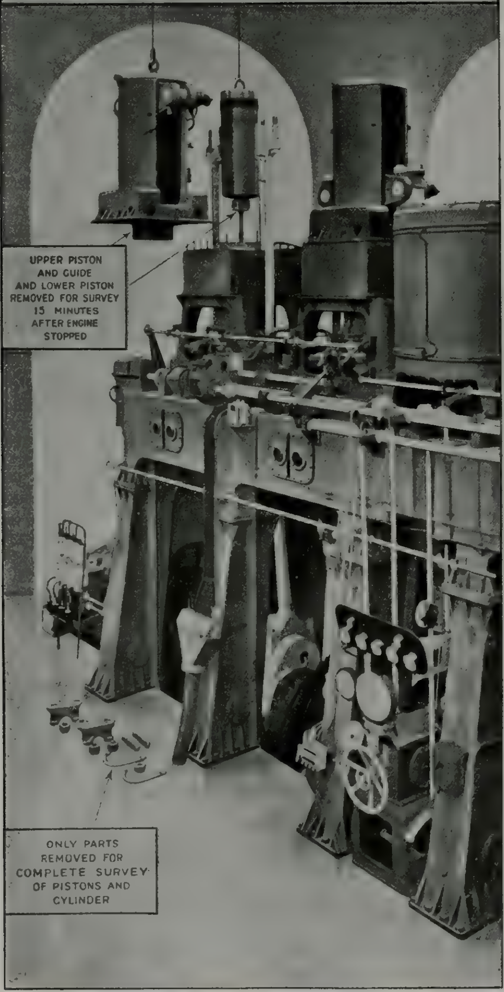
This yard also has an order for six diesel-electric vehicular ferryboats for the Electric Ferries, Inc., New York, C. D. Winslow, President. They are to be 155 ft. long, 48 ft. 6 in. beam, and 14 ft. 3 in. draft. Two Nelseco diesel engines, to be built by the New

The tank steamship John Archbold, largest in the world, on drydock at Bethlehem Shipbuilding Corporation, Ltd., Union Plant, San Pedro, California, recently, when she was equipped with twin contrapropellers.

DOXFORD

PATENTED AIRLESS INJECTION OPPOSED PISTON OIL ENGINES

OIL ENGINE ACCESSIBILITY



UPPER PISTON AND GUIDE AND LOWER PISTON REMOVED FOR SURVEY 15 MINUTES AFTER ENGINE STOPPED

ONLY PARTS REMOVED FOR COMPLETE SURVEY OF PISTONS AND CYLINDER

In Pacific Coast *Shipyards*

Ship Repairing — Ship Building — Reconditioning — Engine Repairs

London Ship & Engine Company, will develop 350 horsepower each and will be connected to Brown-Boveri generators of about 500 horsepower, giving the boats a speed of 13 miles an hour. Keels will be laid this summer.

American Shipbuilding Co., Cleveland, O., has a contract from Pickands, Mather & Co., Cleveland, for two additional 600-foot lake-type freighters, similar to the two vessels completed for the same owners in April.

American Bridge Company, Pittsburg, Pa., has an order for twenty steel coal barges for Hillman Transport Co., 175 by 26 by 11 ft.

Bethlehem Shipbuilding Corp., Union Plant, San Francisco, has a contract from the Associated Oil Company, 79 New Montgomery St., San Francisco, for an oil tank barge 167 ft. over-all, 160 between perpendiculars, 38 ft. breadth, 9 ft. 6 in. molded draft, 7ft. loaded draft, to be powered with two Union Gas Engine Company (Oakland, Calif.) diesel engines of 110 horsepower each. Keel will be laid June 15.

Nashville Bridge Company, Nashville, Tenn., has an order for a deck barge 110 by 24 by 5 ft.

Staten Island Shipbuilding Co., Staten Island, N. Y. has an order for the International Elevating Co. for a grain elevator 130 ft. over-all, 35 ft. beam, and 9 ft. draft forward and 11 ft. draft aft, to be powered with diesel engines.

Supple & Martin, Linnton, Oregon, will shortly start construction of a covered barge 90 by 32 by 7.2 ft. A derrick barge 100 by 34 by 7.6 feet will be constructed after the covered barge is completed.

Victoria Motor Boat Company, Victoria, British Columbia, has an order from the Oceanic Fish Oil & Meal Co., Ltd. for a 55-foot seine boat. The craft will be 14 feet beam and fitted with a 45-horsepower Fairbanks-Morse diesel engine.

Manitowoc Shipbuilding Company, Manitowoc, Wis., has an order from the Grand Trunk Western Lines for two twin-screw, steel, coal-burning car ferryboats for service between Grand Haven and Milwaukee. The boats will be 360 ft. between perpendiculars, 56 ft. molded beam, 21½ ft. molded depth. They will have four tracks to accommodate 26 cars. Passenger accommodations will be provided on a shelter deck. Triple expansion steam engines and Scotch boilers will develop 2800 horsepower.

Victoria Motorboat Company, Victoria, B. C. has an order from the Oceanic Fish, Oil & Meal Co., Ltd. for a 55-foot seine boat fitted with a 45-horsepower Fairbanks-Morse diesel engine, to cost about $10,500.

Chas. Ward Engineering Works, Charleston, West Virginia, has a contract from the W. C. Kelly Barge Line for two towboats to be propelled by diesel engines; also nine steel barges for the same line; they are also building a stern-wheel diesel towboat and a steel barge for stock.

KEEL LAYINGS.

Passenger and auto ferryboat for Fisher's Island Nav. Co. by Bethlehem Shipbuilding Corp., Harlan Plant, Wilmington, May 19; carfloat for Long Island R. R. Co., May 1.

Carfloat for Western Maryland R. R. by Bethlehem Shipbuilding Corp., Baltimore, May 20.

Twin screw passenger and freight steamer for Eastern Steamship Lines by Wm. Cramp & Sons Ship & Engine Building Co., May 1.

Passenger and freight steamer for Clyde Steamship Co., by Newport News Shipbuilding & Drydock Co., May 15.

Barge for Sun Oil Co. by Sun Shipbuilding Co., Chester, Penn., May 26; barge for same owners May 3.

Steel barge for Kelly Axe Co., by Chas. Ward Engineering Works, June 1.

LAUNCHINGS.

Cape May, ferryboat for Philadelphia & Reading R. R. Co., by Bethlehem Shipbuilding Corp., Harlan Plant, May 1.

Malolo, express passenger and freight liner for Matson Navigation Co. by Wm. Cramp & Sons Ship & Engine Building Co., June 26.

Lighter for Wm. Spencer & Son by Federal Shipbuilding & Drydock Co., May 27.

Floating dock for Ford Motor Co. by Great Lakes Engineering Works, May 28.

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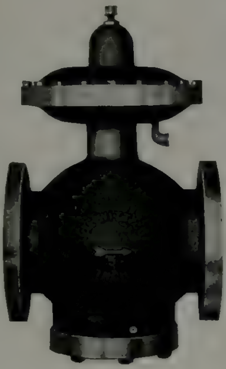

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In Atlantic Coast *Shipyards*

Ship Repairing — Ship Building — Reconditioning — Engine Repairing

LAUNCHINGS.

Robador, diesel yacht for Robert Law, Jr., by Newport News Shipbuilding & Drydock Co., May 29.

Sumar, diesel motor yacht for David C. Whitney by Todd Engineering, Drydock & Repair Corp., Brooklyn, Apr. 14; Sivad, diesel motor yacht for S. P. Davis, May 25.

E. D. Kenna, stern-wheel towboat for The Ohio River Co. by Chas. Ward Engineering Works, May 21.

DELIVERIES.

Holland, submarine tender for Navy commissioned June 1, at Puget Sound Navy Yard.

Six barges for The Barrett Line by American Bridge Co., May 20.

Two steel dredge hulls for Hainesport Mining & Trans. Co. by Wm. Cramp & Sons, May 3 and 6.

Lighter for Wm. Spencer Co. by Federal Shipbuilding & Drydock Co., June 3.

Gillett, diesel-electric towboat for U. S. Engineers by Nashville Bridge Co., May 16.

Chatham, combination passenger and freight steamer for Merchants & Miners Transportation Co. by Newport News Shipbuilding & Drydock Co. May 18; two towboat hulls for Pennsylvania Railroad, May 30.

Barge for Sun Oil Co. by Sun Shipbuilding Co., May 28.

REPAIRS.

Moore Drydock Company, on a bid of $17,900 and 38 days, was awarded contract recently for repairs to the ferryboat Eureka of the Northwestern Pacific Railroad, San Francisco. The main cylinder head of the vessel blew out and the repair work will consist of the renewal of this cylinder, connecting rods, crank pins, and walking beam.

* * *

General Engineering & Drydock Company, Alameda, Calif., is engaged in reconditioning the steamer Newport which is entering the coastwise service of the McCormick Steamship Company. The work will cost about $40,000 and will include general reconditioning and overhaul, the installation of new winches, and improvements to passenger quarters.

* * *

Marine underwriters estimate that the amount of damage done to the Associated Oil Company's tanker Paul Shoup by an explosion recently will be $200,000. The vessel was undergoing repairs at the Potrero Works of the Bethlehem Shipbuilding Corporation when an explosion of accumulated gas in the forward hold did considerable damage, resulting in the injury of four men and the starting of a fire aboard the vessel.

STEAMER CORRALES CONVERTED.

The steamer Corrales, built at Manitowoc in 1918 for the United States Shipping Board, is being completely overhauled and refitted at the General Engineering and Drydock Company, Alameda, for Pillsbury & Curtis of San Francisco for the lumber carrying trade. New masts and longer derrick booms, with new winches will be installed. She is being changed from a coal to an oil burner by the installation of Fox oil burners, which have given so much satisfaction in the steamer Lake Superior. Another feature of the rearrangements is that the old side and pocket coal bunkers have been ripped out to the shell and new oil-tight bunkers installed. The vessels, similar to this, used in the lumber trade travel half the time practically empty, and carrying oil in double bottoms with no load in holds or on deck has a tendency to give them too much metacentric height and so make them very cranky in a sea way. The Corrales will be ready for service shortly.

* * *

The Burrard Drydock Company, North Vancouver, British Columbia, will soon deliver two self-propelled oil tank barges for British Columbia deliveries. One, for the Imperial Oil Company, is 95 feet long and 19 feet beam and powered with Atlas-Imperial diesel engines. The other is for the Union Oil Company of Canada and is 90 feet long, 34 feet beam, and 9 feet depth, with a capacity of 2100 barrels of oil.

* * *

The Prince Rupert Drydock & Shipyards, Prince Rupert, B. C., is building a 127-foot motor boat for the Okanagan Lake Boat Co., Summerland, B. C., to be equipped with two 210-horsepower Gardner diesel engines. The boat will have accommodations for 130 day passengers and 100 tons deadweight.

* * *

The tugboat Shaver of the Shaver Transportation Company, Portland, Oregon, is now undergoing conversion at the Portland Shipyard from a steam powered, stern wheel towboat to a twin screw diesel powered towboat. The tunnel stern has been completed, two propellers shipped, and the installation of two 375-horsepower Atlas-Imperial diesel engines is now under way. Considerable interest is being taken by Pacific Coast operators of steam towing craft, and the results of the new power will be watched with interest.

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After a successful trial trip, another large passenger and freight vessel entered service recently—that is the ferryboat Chippewa operating on Puget Sound between Seattle, Bremerton and Port Orchard by the Puget Sound Navigation Company. The Chippewa is 220 feet long, 52 feet beam, and has a capacity of 90 automobiles and 2000 passengers. She was formerly a steamship by the same name and was rebuilt and converted to a ferryboat by the Lake Washington Shipyards, Houghton, Washington.

Bethlehem Shipbuilding Corporation, Union Plant, San Francisco, was lowest bidder for the reconditioning of the United States Army Transport Thomas when bids were opened at San Francisco recently. The bids submitted were as follows:

Bethlehem Shipbuilding Corp., $34,465;
Mare Island Navy Yard, $41,221;
General Engineering & Drydock Co., $41,562;
United Engineering Co., $41,607;
Moore Dry Dock Company, $42,035;
Thoe-Smith, $43,820;

* * *

ADDITIONAL EQUIPMENT ORDERS PLACED FOR MALOLO.

The launching of the steamship Malolo on June 26 at the plant of the Wm. Cramp & Sons Ship & Engine Building Company brings the progress of construction of the vessel to the interior furnishings and equipment. The designers of the Malolo have had as their aim the comfort and convenience of passengers, and interior furnishings that will be the last word in naval architecture and ocean-traveling luxury.

This may be seen in the order recently placed with the **Wm. H. Jackson Company,** 2 West 47th Street, New York, for Magicoal Electric Fireplaces, and with the **Display Stage Lighting Company, Inc.,** 340 West 44th Street, New York, for electric burning log. These will be installed in the library and smoking room.

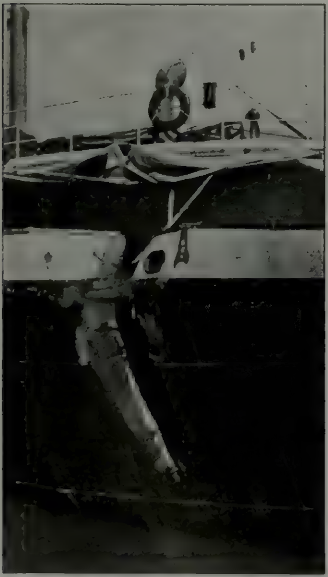
It is always of interest to ocean travelers to know the correct time in view of the fact that is more or less changing while en route to their destination, and this feature has been taken care of by the order for an electric clock system, which will be operated by a master clock and twenty-two secondary clocks located throughout the vessel. The order for this system has been placed with the **Magnetic Clock Company of New York.**

Another feature of convenience to passengers will be the three safes which have been ordered from the **York Safe & Lock Company,** Philadelphia. There will be one large double door safe, containing at least 100 compartments, each with its own special key for the safe keeping of passengers' valuables. In addition there will be two other safes for the official use of the steamer personnel.

A complete printing outfit has been ordered from the **American Type Founders Company** of Philadelphia to provide a complete printing shop for the Malolo to take care of all the printing needs of the ship as well as the publication of a daily newspaper.

Other equipment of a less spectacular nature but probably even more essential to the comfort and convenience of passengers is the complete and modern laundry equipment ordered from the **Troy Laundry Machinery Company** of Troy, New York. This order includes the outfit for the swimming pool drying room as well as all pressing equipment for the tailor shop, and will be capable of taking care of the entire laundry needs of the steamship Malolo.

An order for evaporators, distillers, and aerating filter for the Malolo has ben placed with the **Griscom-Russell Company** of Philadelphia. This equipment will consist of two evaporators, two vertical strait tube distillers, and one aerating filter. This outfit will provide fresh water for drinking and boiler feed in case of emergency.



The above illustration shows damage done to the steamer Harry Luckenbach when hit by the steamship San Juan recently. Repairs were made in three days at the Los Angeles Shipbuilding & Drydock Corp.

* * *

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Associates, hull 5330, diesel tank barge for Associated Oil Company; 160 L.B.P.; 38 breadth; 9′6″ molded depth; 7′ molded draft; 4000 bbls. oil capacity; Union diesel engs.; keel June 15/26 est.

GENERAL ENGINEERING AND DRY-DOCK CO.,

Alameda, Calif.

Golden State, hull 1, double-ended diesel-electric ferryboat for Golden Gate Ferry Co.; 240′ over-all; 44′ molded beam; 17′ molded depth; Pacific Werkspoor diesel engs.; G.E. generators; keel Dec. 14/25; launched May 2/26; deliver June 30/26 est.

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.,

San Pedro, Calif.

No name, hull 50, cabin cruiser for Don Lee; 140′ O.A.; 23′ 6″ beam; 9′ depth; 12.5 knots speed; 242 DWT.; diesel engs.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

D. L. Co. No. XLIX., hull 71, scow, 110x36x8′ 8″; keel Apr. 15/26; launch and deliver May 3/26 est.

Margnita, hull 74, mail, freight, and passenger boat for Coastwise Transportation Co., Juneau, Alaska; 90 L.B.P.; 22 beam; 15′6″ draft; 200 H.P. diesel engs. Keel Apr. 24/26; deliver June 24/26 est.

LAKE WASHINGTON SHIPYARDS

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Yacht for Frank Manz, 56′ long, 14′ beam; 6′ draft; 100 I.H.P. Hall-Scott eng.

Yacht for Wm. Trimshaw, 50′ long; 100 H.P. Eastern Std. eng.

MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

No name, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; keel May 3/26; launch Oct. 1/26 est.; deliver Dec. 1/26 est

No name, hull 171, sister to above; keel May 3/26; launch Oct. 15/26 est.; deliver Dec. 15/26 est

Hull 169, steel carfloat for Atchison, Topeka & Santa Fe R.R.; 260′ long; 38′ beam; 7′ draft; 620 D.W.T.; keel Apr. 1/26; launch Aug. 15/26, est.; deliver Aug. 31/26 est.

NAVY YARD

Puget Sound

Holland, submarine tender for government; 460 **LBP; 61 beam; about 20 loaded draft; 16 K loaded speed;** turbine **eng. 7000 IHP; two WT express** type boilers; 10,000 tons disp.; **keel Apr. 11/21;** launched Apr. 16/26; **commissioned June 1/26.**

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

ST. HELENS SHIP COMPANY,

St. Helens, Oregon.

Larch, tender for Lighthouse Dept.; 63′ long, 16′ width, 6′ hold; 100 H.P. Washington-Estep diesel engs.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Twenty-five barges for Carnegie Steel Co.; 175′x26′x11′; **21 delivered.**

Six barges for The Barrett Line, Inc., Cincinnati; 225′x36′x8′; **delivered May 20/26.**

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 149′ 2″ x 33′ 4″x5′ 10-5/16″.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 170′ x 38′ 10″ x 6′ 1¾″.

Six steel barges for The Barrett Line, Cincinnati, 225′x40′x9′.

Two fueling scows for The Barrett Line, 100′x18′x8′.

Twenty (20) steel coal barges for Hillman Transportation Co.; 175x26x11 ft.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

Hull 312, dredge hull, 140 ft long, for Bneyons Co.; keel Sept./25; deliver June/26 est.

Hull 314, suction dredge for U.S. Engineers; 130′ R.R.; 366′ long; 2 tracks; platform; keel Apr./26.

Hulls 315-318 inc.; 4 carfloats for N.Y. Central R.R.; 366′ long; 2 tracks; platform; keels (2) Apr. and (2) May/26.

Hull 319, steel motor patrol boat for U.S. Coast Guard, Washington, D.C.; 125 L.O.A.; 23′6″ molded beam; 220 tons displacement; Winton diesel engs.;

Personal Paragraphs and Items of Interest

Westinghouse Official Honored

LOYALL A. OSBORNE, president of the Westinghouse Electric International Company, was signally honored recently when he was elected chairman of the National Industrial Conference Board at the tenth annual meeting of that organization in New York City.

In accepting this office, Mr. Osborne assumes the chairmanship of a body whose members are delegates of twenty-seven national and state industrial organizations and four government departments, comprising more than 50,000 manufacturing concerns employing a total of more than 7,000,000 men and women. The board maintains a large staff of economists, statisticians, and engineers who are continually investigating domestic and foreign problems of economic-industrial interest, and, since its origination in 1916 has issued 115 research and 35 special reports and many monographs on subjects of timely and practical concern.

Mr. Osborne, who is a graduate of Cornell University, '91, joined the Westinghouse organization immediately upon leaving college, and was made vice-president of the Westinghouse Electric & Manufacturing Company in 1902. He is now senior vice-president. During the war, he was a member of the Council of National Defense, a member of the War Labor Planning Commission, and of the War Labor Board. He succeeds Frederick P. Fish of Fish, Richardson & Neave, Boston, as chairman of the Conference Board.

Frank W. Bitley

Loyall A. Osborne, president of the Westinghouse Electric International Company, and recently elected chairman of the National Industrial Conference Board

Old Timer

FRANK W. BITLEY was born in Minnesota seventy-two years ago. He is still an active marine engineer, well known on the San Francisco waterfront. Mr. Bitley came to California in 1872 and learned the trade of marine machinist at the old Fulton Iron Works, San Francisco. Finishing his apprenticeship he went as oiler on the old City of Pekin, at that time the largest vessel flying the American flag. The engineer officers were Robert Forsyth, William McClure, R. A. Turner, and A. McKinnon. All these have since signed for the long voyage, but Mr. Bitley still keeps on. During his half century and more of marine work he has been in most of the countries of the world. He had an eventful career in China during the Franco-Chinese War, being an engineer on the famous Miefoo at the time of mutiny and massacre. For many years past he has been principally employed on coasters, as he wished to be closer to his family than deep sea trips permitted. Still hale and hearty, Frank hopes to in time achieve the distinction of being the oldest holder of License for Chief Engineer in the United States.

A New Foster Record

A RECENT number of the Stanocolan, bi-weekly publication of the Standard Oil Company (La.), features a very interesting towing record made by the towboat Sprague.

The Sprague is a stern wheel Mississippi River towboat 315 feet long, 64 feet beam, and 7 feet 6 inches depth and fitted with two tanden compound engines 28 inches by 65 inches diameter cylinder and 12-inch stroke. The paddle wheel is 40 feet wide and 37 feet in diameter. This is said to be the largest paddlewheel in the world.

Until recently operating conditions on this boat were far from satisfactory. The fuel consumption was 15 barrels an hour and repairs to her steam generating equipment were constant. After being fitted with Foster steam generators, radiant heat type superheaters and economizers about six months ago, the fuel consumption was reduced to 11 barrels an hour, and on test made by the Standard Oil Company's engineers, an over-all steam generating efficiency reached 85 per cent, which is said to be almost a record for any steamer regardless of size or type.

On a recent trip the cargo towed, or pushed, by the Sprague consisted of twenty-one barges containing 244,782 barrels of oil. This load was successfully conveyed from Smackover oil fields to Baton Rouge. The tow occupied a space of 260 feet wide and 1123 feet long. The oil carried was the equivalent of capacity load for thirty trains of oil tank cars having forty cars in each train, or a total length of ten miles, and it was a much larger quantity of oil than the largest tank steamer in the world could possibly carry.

During the next few trips it is planed to increase the tow of the Sprague to 300,000 barrels of oil. It is said that this Mississippi river towboat holds the world's record for low transportation costs.

New A. C. Starter

A NEW starter announced by the General Electric Company bears the type designation CR-7055-A-1. It is a reversing primary resistor starter for squirrel cage induction motors.

Two three-pole line contactors are provided with this starter. These contactors are electrically and mechanically interlocked and are mounted back-to-back on the panel. A magnetic time interlock provides a predetermined definite time of from one to three seconds between the closing of the line contactor and of the accelerating contactor.

Two-point starting is provided by a resistor designed to conform to Electric Power Club classification No. 16. A temperature overload relay with an external resetting mechanism furnishes overload protection.

The enclosing case is of sheet metal, semi-ventilated, and is provided with feet for wall mounting. When mounted, the panel occupies a position at right angles to the wall. Doors may be locked and are provided at front and back of the panel.

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Pacific Marine Review

The National Magazine of Shipping

August, 1926

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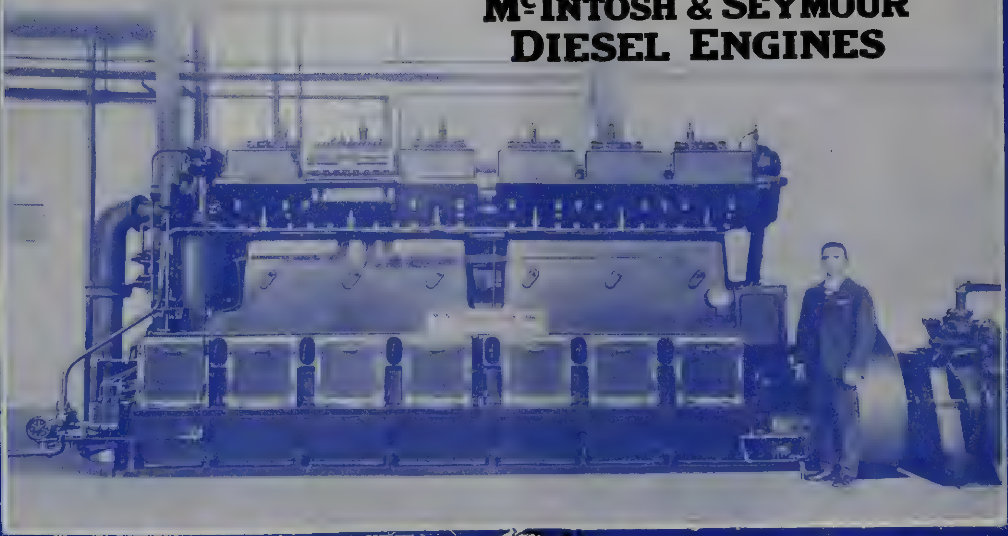

Official Organ

Official Organ
Shipowners' Association

Pacific Marine Review, Vol. 23, No. 8, Published Monthly at San Fancisco. Entered as second clars matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

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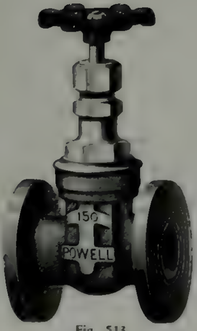

Fig. 513
150 Pound Gate Valve

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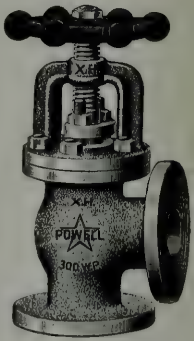

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Regrinding Angle Valve

DEALERS WITH STOCKS IN ALL PRINCIPAL PORTS

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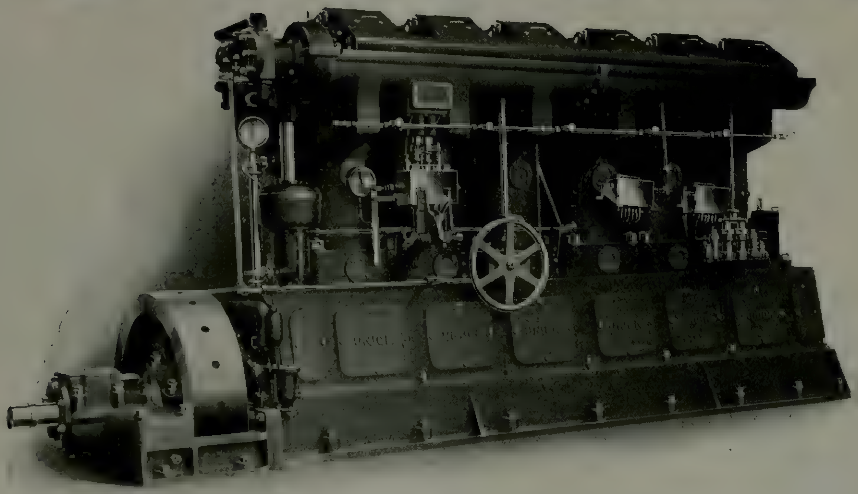

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AUGUST 1926 Vol. XXIII. No 8

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Official Organ
Shipowners' Association of the Pacific

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S. Hines.
Published on the 25th of each month preceding the publication date.
Advertising and editorial forms close on the 15th.
Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Wanted a Name

THE new Panama Pacific liner, now building at the Newport News Shipbuilding & Drydock Company's plant, needs a name, and the choice of moniker is creating quite a bit of interest, as evidenced by this statement culled from the current issue of "The Atlantic Ferry."

It has often been said that Americans are not naturally ship minded; that the country had such vast inland interests, only a small part of its population knows or cares anything about ships. While this may be true as a general statement, one exception must be made to the rule, and that applies to the Pacific slope states.

Not long ago we made it known that the Panama Pacific Line is building a vessel for its New York-California route, which will be the largest ever constructed under the American flag, and that the new queen of the American merchant marine would be given a name suggestive of the Pacific slope.

At once the citizens of the state of California, true to their traditions as boosters, began writing in suggestions for a name for the ship. Scores of names have been submitted. One quite obviously is California. Another is Monterey, for the old Pacific capital. Another is Mariposa, which in the popular mind connotes the big trees of the state of California, the oldest living things on the face of the earth, and the mightiest. Another name suggested is Montezuma, for the last of the Aztec rulers, whom the Spaniards found living in regal splendor, surrounded by gold.

The ship is not yet named; but this interest of the people of the great state to which she will ply—an empire in riches, and a genuine promised land for business development—cannot be otherwise than gratifying to the executives who are venturing their business judgment on the construction of this splendid vessel for the California trade.

Non-Sinkable Ships

MANY naval architects and many practical ship builders since the days of Scipio Africanus and Julius Caesar have worked on the problem of designing unsinkable ships. After each great marine disaster and during each great war involving naval combat the activity in this direction becomes almost feverish. Many very fine practical ideas and much of the best in modern ship design have resulted from these efforts, notwithstanding the fact that the great majority of the designs produced were at the time impractical when considered as commercial carriers for the purpose in hand.

As a practical matter of statistical data the best of our present day passenger carriers are nearly unsinkable, and in the present state of the ship building art and at the present costs of construction, the elimination of the percentage of sinkability still clinging to the ocean ferries can only be achieved at practically prohibitive costs.

The late George W. Dickie of San Francisco designed some unsinkable types and presented a paper on the subject before the American Society of Naval Architects and Marine Engineers. The type proposed in that paper was of a very practical nature and was figured floatable with the entire bottom cut off. This paper was presented just after the Titanic disaster and created considerable interest and much discussion.

The great storms of last winter brought many disasters and near disasters and this has again centered the attention of many designers on this problem. A remark made by Mr. Dickie during the discussion of the paper alluded to applies now as then and always to the practical bearing of this designing work. "It is easy to design a nonsinkable ship, but your design will usually be foundered on the drawing board by a nonfloatable overhead."

Industrializing the West

WHAT the industrial opportunities of the Far West are and how to go about disclosing them was the subject of a course of lectures given by E. W. McCullough, manager of the Department of Manufacture of the Chamber of Commerce of the United States at the Western School for Commercial Secretaries, Stanford University, July 25 to 31.

The transition of the country from an agricultural to an industrial nation and the decentralization of industry following the westward trend of population were the major aspects of the subject dealt with by Mr. McCollough. How this general movement affects western cities and towns, what opportunities they offer for industrial development, how their advantages and disadvantages may be brought to light by scientific surveys, and the services that may be rendered to industry through cooperative effort were discussed in detail.

What is your Rat Bill?

RATS have long been a problem with ship owners and with shippers. The damage to property and the loss in provisions caused by rats represents an enormous annual bill to the people of the United States, and proportionately an even larger bill to the peoples of other nations. As a carrier of bubonic plague and other diseases, the rat is a menace to public health.

The Department of Commerce has seriously investigated the control or rats on shipboard and has issued a very instructive and useful pamphlet on the ratproofing of vessels. The following statements made by J. V. Cloos in the course of an address before the Public Health Section of the Commonwealth Club of California will serve to emphasize the gravity of this problem.

The rat is not a native of America, but came to our shores about 150 to 175 years ago. Since that time, the few first pairs of rats have kept pace with the human population; so that now we have about 120,000,000 rats in the United States.

The brown rat is a native of northern India, from whence, in about 1727, hordes of them were driven northwest into eastern Russia, and south into India, just at the time that the British and Dutch began heavy trading with the Indies.

The brown rat became a menace in London about 1731, and in Paris about 1753, and soon became a pest over all Europe, practically destroying the smaller black rat, the rat which had been a pest in Europe for centuries before. The brown rat did not appear on the Pacific Coast until about 1850, and became a menace about 1880.

The brown rat has followed civilization and multiplied as fast as man, tearing down and destroying all that man builds.

Every one of us supports about one rat. It is estimated that the average annual property damage alone, caused by a single rat, is about five dollars. The average cost of feeding a rat per annum is about two dollars.

Large buildings are often built right up around a colony of rats. The piles are driven for the foundation, the noon whistle blows, the workmen partake of their lunch, uneaten portions are thrown here and there, day in and day out until the building is completed.

During the very first night after work has been begun, rats will come from nearby alleys and neighboring premises to feed, and as the rats find particles of food every evening, they stay on the premises so that the building harbors a splendid colony of rats before the tenants move in.

Professor Donaldson estimates our rat population at 120 millions. Havelock Ellis points out that "throughout its millions of years on earth up until the year 1800, the human race has increased from its first pair to only 850 millions," but, "within the mere flash of a century the rat population has leaped from 850 millions to nearly 3000 millions."

God's Ways on Deep Water

LANDSMEN often marvel at the persistence of Jack in Shipping for long voyages on deep water when always wherever he lands he is full of grumblings and curses for his hard life in the fo'c's'le.

Perhaps the following bit of prose rhapsody, written by an American whaleman, will serve to explain at least a part of this sea lure.

"One of the most beautiful phenomenon attending a passage in these latitudes (lat. 5°40′ S., long. 156°W., one degree east of Hawaii) is the phosphorescence of the water. To attempt a description of this must be more or less futile, for many words of brightest meaning fall still short of the sparkle of a star. Many times the wake of the ship is a broad belt of pale yellow light, far as the eye can follow it. The whirling eddies are almost aflame, and they fade in the darkening distance into nebulous light. The infinite sea surrounding is a fit setting to the brilliant coruscations. The combing break of the waves flashes like sheet-lightning on a summer's night; and as the cresting flame of the head-sea is scattered by the bows, its spray falls in drops of fire on the watch, and the scuppers gleam with stars run wild. Deck, sea, and sky are illumined with myriad points of light, of rivaling brilliancy.

"On one occasion, after hauling out a weather ear-ring for a close reef in the foretopsail, I paused as long as other duties would permit, to drink in the ravishing sight which, with torrent speed, was rushing beneath me. The whole sea was wild with broad sheets of light under the tossing of the gale; the spray from the wave-caps was a shower of fireworks, and the bows and head-gear of the ship were illumined from the watery light under the forefoot. Two hundred feet to windward, and holding a course parallel with ours, was a magnificent finback whale, the minutest outlines of its great form defined in light, as though it was of burnished gold. His spout, given in a tumultuous sea, sent a stream of fire half-main-yard high. And I saw how grand the resplendent whales may be in each other's eyes as they disport in the phosphorescent seas of the tropics. At last I felt compensated for the innumerable heart-sinkings and cold sweats of apprehension I had endured, and I drank into my inmost memory the lesson of the power and grandeur of a gale of wind as seen from the swinging yard of a tossed ship at sea.

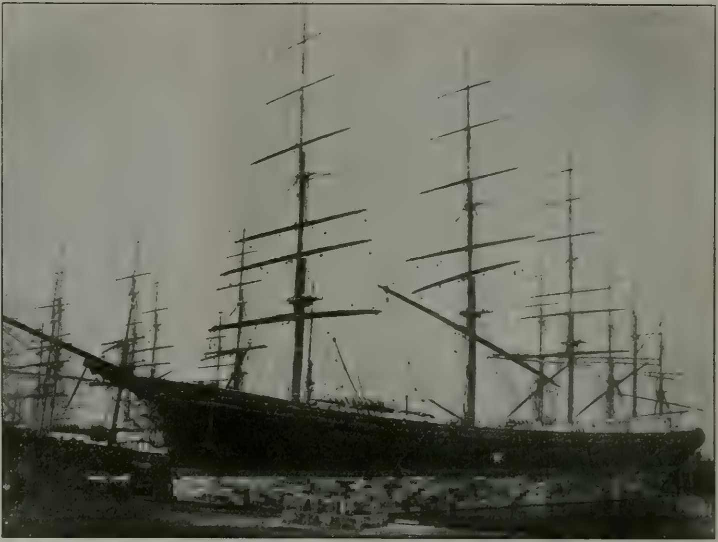
"The lights are revelations of the teeming life which crowds every foot of this vast ocean surface; but that is all I know. In the absence of knowledge, I am content and happy to look on and admire, while something whispers in my ear, 'Such are God's ways on deep water.'"

(From Nimrod of the Sea or the American Whaleman, by William M. Davis).

The American Ship Ocean King

A Brief Story of a Maine-built Four Masted Freighter of the Seventies

By F. C. Matthews.



An interesting view of the American ship Ocean King alongside the wharf at San Francisco. Note the large showing of copper sheathing.

THE Ocean King, built by Nathaniel Thompson at Kennebunk, Maine, in 1874 was the second four masted sailing ship to be constructed in the United States, being launched some twenty years after Donald McKay's celebrated clipper Great Republic. On her advent, the Ocean King was the largest sailing ship afloat with the exception of the Three Brothers, a converted steamship.

She was 250:5 by 42:3 by 30:1 and registered 2516 tons. A half poop deck four feet high extended from aft to midway between the mizzen and main masts and on top of this was a trunk cabin reaching to within three feet of the rail on both sides. On the main deck, forward of the main hatch, was a large house for galley and crew's quarters. She carried three skysail yards but was not a lofty ship nor were her yards as square as those of oldtime clippers half her size, her main yard being but 86 feet and main royal yard 42 feet. The jigger or spanker mast was fore and aft rigged. Bowsprit and jibboom were short, her three principal masts being set so far forward as to obviate the necessity of much head sail being carried.

The Ocean King was owned by her builder and friends in Boston and San Francisco and by J. Henry Sears & Company, of Boston, who were her managers. Captain William Freeman, who became her commander, also had an interest. Captain Freeman had shortly before lost his ship Mogul by fire while bound from Liverpool to San Francisco and was also well known in connection with his earlier commands, Kingfisher, Monsoon, and other ships.

The Ocean King was built under the supervision of the American Board of Underwriters and classed A-1, 11 years. She had no pretension of being clipper model. Her grain cargoes from San Francisco to Europe averaged a little over 3000 tons, while returning with coal to the Pacific Coast port they ran from 2300 to 2800 tons. Of weight and measurement cargo from New York, she carried about 4000 tons. On the coasting voyage in which she met her fate she had the largest cargo in her career, 3850 tons of coal, being down to a mean draft of 27 feet 10 inches.

Prior to June 1883 the Ocean King was operated only in trade between San Francisco and New York or ports in Europe. Her three outward passages from New York were made in 140, 140, and 165 days. Those from Liverpool took 130, 150, and 142 days, and she made one run from Newcastle-on-Tyne, 150 days. She made four passages from San Francisco to Liverpool, 142, 138, 136, and 132 days; one to Antwerp in 152 days; and one to New York, 145 days. Her highest grain freight was 72 shillings, 6 pence; and her average freight for the five passages she made in that trade is 55 shillings. Of the eight years she was engaged in deep water sailing no less than three years were spent in ports discharging, loading, or awaiting charter.

After her arrival at San Francisco in June 1883, the Ocean King, in common with many other ships, was laid up, there being little or no demand for tonnage. Captain Freeman then sold his interest and took command of the ship Jabez Howes. After being idle some three years the Ocean King was chartered to load coal at Nanaimo for San Francisco, and Captain Sawyer became master.

Sailing from San Francisco April 20, 1886 she had made two round voyages by September 18, transporting in all 7300 tons at $2 per ton. She then took a cargo of coal from Nanaimo to San Pedro and after leaving the British Columbian port April 27, 1887 on her second round, she was lost. All was well for the first three days after the ship passed Cape Flattery when a succession of Southwest gales commenced and a leak developed which necessitated the pumps being worked by steam. After six days, the pump shaft broke but hand pumping continued, the men being lashed to prevent being swept overboard through the high seas breaking over the vessel. On May 8 the ship was abandoned, having some eight feet of water in her and laboring heavily. The sealing schooner Angel Dolly rescued the crew in her own boat, the ship's boat having been crushed in being put over the side. The ship was then discovered to be on fire near the galley. At six P. M. May 8 she went down, 35 miles west of Cape Arago. She was valued at $40,000 and partly insured. The cargo was insured for $12,500.

An American-British Shipping Dinner

American Shipowners of New York Arrange Pleasant Function Complimentary to British Delegates at Oil Pollution Conference

DURING the month of June there was held at Washington, D. C., a first international conference to consider the situation of the pollution of shore waters by the discharge of oil from tankers and oil burning vessels.

A number of experts from the various countries and lines of activity affected by oil pollution got together at the conference and after a week's discussion arrived at an understanding and established a preliminary basis for agreement.

The main points covered were that prohibited areas into which waste oil must not be discharged should not extend more than fifty miles from the coasts and that for practical purposes a mixture containing more than 0.05 of 1 per cent of oil should be regarded as constituting a nuisance. This preliminary agreement will, of course, have to be ratified officially by the various countires represented and will in a large number of instances be modified to suit proximity of offshore fishing grounds. Nevertheless it is a long step in advance to have reached this definition and this preliminary agreement, and undoubtedly this much discussed question will reach the stage of an effective international agreement before many years pass by.

A group of American shipowners in New York made the close of the conference the occasion of a very pleasant dinner in honor of three of the British representatives, guests of honor being Charles Hipwood, C. B., principal assistant secretary of Mercantile Marine Department, British Board of Trade; A. E. Laslett, deputy engineer and surveyor in chief of the Mercantile Marine Consultive Department of the British Board of Trade; Archibald Maclean, of the Chamber of Shipping of the United Kingdom.

This dinner was held at Sherry's, New York, Friday evening June 18, 1926. The following were present:

Guests.

Sir Harry Gloster Armstrong, K.B.E., British Consul General; James French, Lloyd's Register; Henry C. Hunter, secretary, Atlantic Coast Shipbuilders' Association; Captain H. M. Seeley, supervising inspector, 2nd District, U. S. Steamboat Inspection Service; William H. Todd, Todd Dry Dock & Construction Corporation; John Stewart, representative of Sir J. W. Isherwood, Bart.

Shipowners' Representatives and Friends.

The three guests of honor at shipowner's dinner. Left to right, Archibald McLean of the Chamber of Shipping of the United Kingdom; Charles Hipwood, C. B., principal assistant secretary of the British Board of Trade; A. E. Laslett, deputy engineering surveyor in chief Mercantile Marine Consultive Department, British Board of Trade.

E. F. Luckenbach, G. H. Lundbeck, R. T. Thackara, and P. K. Kuhme, all of the Luckenbach Steamship Company; A. V. Moore and E. J. McCormick, of the Moore & McCormick Company; T. H. Rossbottom, United States Lines; John Franklin, Argonaut Steamship Line; John Dowd, president, Maritime Association of the Port of New York; J. R. Gordon, Union Sulphur Company; E. C. Bennett, naval architect; J. S. Keegan, Johnson & Higgins; C. W. Bowring, Bowring & Company; C. C. Rodriguez, W. W. Battie & Co.; Ira A. Campbell and C. T. Cowenhoven, Kirlin, Woolsey, Campbell, Hickox, and Keating; H. C. Blackiston and W. J. Love, Furness-Withy & Co.; F. C. Hannebrink, delegate from The Netherlands to the Oil Pollution Conference; J. D. Meehan and R. J. Trodden, Barber Steamship Lines; G. D. Ali, Standard Transportation Co.; John Wright, Pan-American Petroleum & Transport Co.; J. R. Kennedy, Gulf Refining Company; R. F. Hand, H. J. Esselborn, Bruce Gibson, C. E. Klitgaard, and W. F. Dunning, Standard Oil Company, N. J.; J. S. Keith, Lambert Bros., Inc.; Andrew Baxter, Jr., Federal Composition & Paint Co.

The Shifting Trade Balance

IN its analysis of the foreign trade of the United States for the first four months of 1926 the Department of Foreign Commerce of the Chamber of Commerce of the United States finds that the most striking development has been the shifting of the trade balance from exports to imports.

Significant as this might appear, however, the Department does not regard the change as momentous.

"An excess of imports for a month, a quarter, or even a year," the Department says, "is not unknown in our foreign trade. Since July 1866, in 194 out of 718 months, or more than one-fourth of the time, monthly imports have been larger than exports. However, in this period there have been only 11 years in which the total yearly trade showed an unfavorable balance, all occurring before 1894.

"In the last 25 years an excess of imports in three successive months, has occured five times—in 1909 1910, 1914, 1923 and 1926—one period (1914) even extending to five months and two (1923 and 1926) extending to four successive months.

"A smaller United States grain crop, diminished demand from the European textile industry, and restricted buying generally in Europe all combined this year to curtail severely our exports of raw cotton, grains, and copper, a decrease which more than offset the splendid gains in our exports of numerous lines of American manufactures."

Brilliant Launching for the Malolo

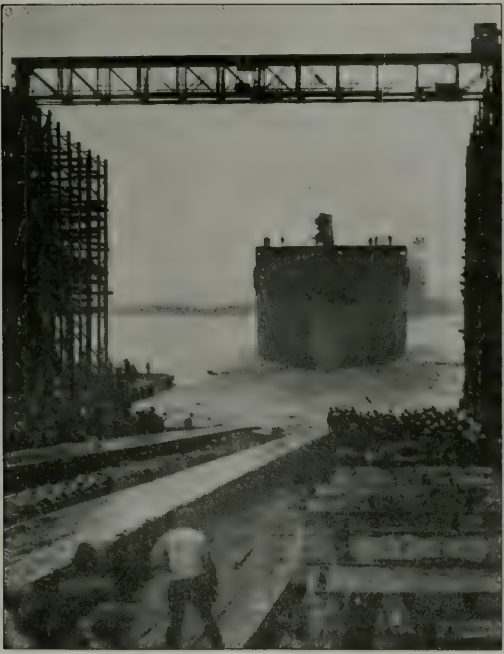
The Chrysalis of the Flying Fish Glides Peacefully into the Placid Waters of the Delaware

ONE of the most successful—and in many respects most unique and brilliant launchings accurred in Philadelphia at the shipyard of the Wm. Cramp & Sons Ship & Engine Building Co. on June 26, 1926, when Malolo, the largest high-powered and swiftest steamship ever built in America, slipped down the ways into the Delaware. Malolo, meaning "flying fish" in Hawaiian, was christened by Lurline and Bernice Roth, the six year old twin granddaughters of the late Captain William Matson, who founded the Matson Navigation Company in the early '80s.

A large party, headed by E. D. Tenney, president of the Matson Navigation Company, came all the way from Honolulu to attend the launching. One of the unique features was the picked choir of singers from Hawaii, wearing necklaces of Hawaiian leis, who sang Hawaiian songs as the bottle was broken over the vessel's bows and she started down the ways.

Another large party joined Mr. Tenney at San Francisco and came east. This consisted of W. P. Roth, vice-president of the Matson Navigation Company, with Mrs. Roth and their three children, including the youthful sponsors, Miss Wilhelmina Tenney, Mr. Tenney's daughter, and Mrs. William Matson, widow of the late Captain Matson.

It was originally intended that Mrs. Tenney, wife of the President, would christen the vessel, but owing to ill-health which would make it unwise to make the long and arduous trip from Honolulu, she decided to forego the opportunity and suggested that the twins act in her place.


The Malolo taking the water.

Sponsoring party just after christening the Malolo. From left to right, Miss Wilhelmina Tenney, Honorable Herbert Hoover, Mrs. W. P. Roth, and the Roth twins.

Two special observation cars brought guests from New York to Philadelphia, as did also one special car from Washington, D. C. The parties met at an elaborate luncheon given by Mr. Tenney at the Penn Athletic Club, Philadelphia. Secretary of Commerce Hoover was the guest of honor and principal speaker. Mr. Tenney presided and made a short address followed by the Hon. Herbert Hoover, Commissioner P. S. Teller of the United States Shipping Board, and William Francis Gibbs, president of Gibbs Brothers, Inc., designers of the Malolo. From this luncheon the guests were taken by limousines, escorted by a squadron of police on motorcycles, to the Cramp Shipyard.

Up to the moment of the launching, there had been a slight drizzle but, curiously and almost as an omen, the sun broke through the clouds almost at the exact instant that the twins broke the bottle over the Malolo's bows. This launching was one of the most notable that has occured in this great shipyard. Between 15,000 and 20,000 people were passed into the yard and they lined both sides of the shipway even out to the wing docks.

Matson Progress 1882 to 1926

At the pre-launching luncheon given by President E. D. Tenney of the Matson Navigation Company at the Penn Athletic Club, Philadelphia, to a number of his guests, the history of the Matson Navigation Company was briefly outlined and a number of notable remarks were made concerning the remarkable success of the Matson organization and its bearing on the future of America's merchant marine.

We have abstracted three of the speeches here for the convenience of our readers.

A Brief History of the Matson Navigation Company

By E. D. Tenney, Pres. Matson Navigation Company.

THE steamship Malolo is being constructed by the American-Hawaiian Steamship Company under Section 23 of the Merchant Marine Act of 1920, generally known as the Jones Act. On her completion she will be purchased by the Matson Navigaiton Company and will be put in operation between San Francisco and Honolulu.

It is my purpose to give you a brief history of the Matson Navigation Company and its growth which has led up to the construction of this splendid ship.

In 1882 Captain Matson purchased the little 200-ton schooner, Emma Claudina, and put her in service between various ports in the Hawaiian Islands. He later built the Lurline. This was the first ship built by Captain Matson and the first in which he owned an interest. In those days, ships were generally divided into 32 shares, each person interested buying as many 32nds as they wanted or could afford. Captain Matson managed to borrow enough to purchase 8/32nds.

In 1902, the steamship Enterprise was the next ship he obtained, and just prior to this he decided that the company was of sufficient size to be incorporated, and this was done in the latter part of 1901. The Enterprise had a passenger capacity of 25 and two very inferior bathrooms. The next was the Lurline in 1906, named after the earlier ship. She also had a passenger capacity of 25.

In 1909 the steamship Wilhelmina was built at Newport News. She had a passenger capacity of 146 and 11 baths. She was considered, at that time, a most extravagant venture. I want to tell you a little story in regard to this vessel. Captain Matson was very proud of her and when she was ready for her initial voyage he went to see her with his family and friends. George S. Dearborn, at that time president of the American-Hawaiian Steamship Company, was visiting the city and Captain Matson invited Mr. Dearborn to inspect her. A few days later while addressing, as I recall, the Chamber of Commerce, Mr. Dearborn expressed unbounded admiration for Captain Matson for risking so much in building such a magnificent ship for this service.

In 1917, came the Maui with passenger accommodations for 252 and 32 baths, which was looked upon as very extravagant for Pacific Ocean trade. This was the last ship Captain Matson built and the last voyage he made was the initial voyage of that steamer. He died the latter part of that year.

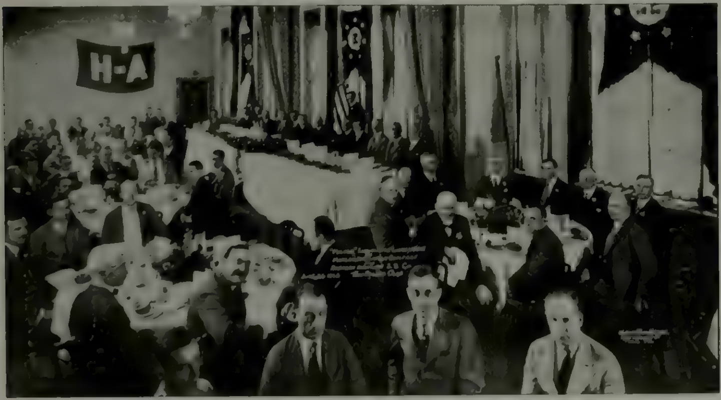
Now we come to the steamship Malolo, which is to be launched this afternoon. She will have passenger accommodations for 693 and 162 baths.

From this, one sees the general move that has been taking place in this trade—from the little 200-ton Emma Claudina in 1882 to the Malolo in 1926. The people of Philadelphia should be proud that such a ship was built in their city. I want to compliment the mechanics and other workmen on the high quality of the work, as it appears to me to the best of my judgment, when I inspected her yesterday.

American Coastwise Marine

By Hon. Herbert Hoover, Secretary of Commerce.

I AM glad to join in the felicitations extended on this occasion. The launching of a great ship stirs deeply our imagination and our racial instincts. Among our primary human instincts there are two which run strong in all men—the yearning for the soil



LAUNCHING LUNCHEON.

The illustration shows a portion of the group gathered at the luncheon given by E. D. Tenney, president of the Matson Navigation Company, to his guests just prior to the launching of the Malolo. Among those present were Phillip S. Teller, United States Shipping Board Commissioner; the Hon. Herbert Hoover, United States Secretary of Commerce; William Francis Gibbs, president of Gibbs Brothers, Inc., designers and supervising architects for the Malolo; W. P. Roth, vice-president of the Matson Navigation Company; J. E. Cushing, Operating Manager American-Hawaiian Steamship Company; E. D. Tenney, President of the Matson Navigation Company and many other prominent shipping men.

and the urge of the sea. Those who say we are not a seafaring people forget that we were born of seagoing races. We came by the sea to this land, and pride and romance of the sea run strong in our blood.

And we are actually today a seafaring people. In our coastwise trade and in its extension to Porto Rico and Hawaii and other outlying possessions; in the service of the Great Lakes we have over 7000 vessels under the American flag, totalling over 8,900,000 tons and employing over 100,000 seamen. These services alone comprise nearly 14 per cent of the world's tonnage and are in themselves a greater fleet than is possessed by any other nation of the world except Great Britain.

We have engaged interminably in discussion and effort during these last fifteen years to expand our merchant marine across the seas. We have today some 3,600,000 tons actively engaged in international trade of which 1,720,000 tons are privately owned.

At least we are learning that governments cannot conduct competitive business. Gradually we will, no doubt, secure this primary marine service upon a basis of private adventure and enterprise—the only way the sea can ever be mastered. We will some day have a sound merchant marine in foreign trade. Our national interests make it imperative.

But it is not my purpose to discuss our governmental failures. Rather would I recount the field in which we have made success. We have builded our coastwise and lake fleets wisely. We have arranged through sound policies for their preservation and protection. From the birth of the Republic we have reserved that trade for vessels owned by our own citizens and built in our own shipyards, operated by private enterprise—not by the government. That policy was laid down in an early session of the American Congress, in the year 1791, when Alexander Hamilton was Secretary of the Treasury and administered our navigation laws. It has been adhered to ever since.

This great transportation system asks no governmental aid and no public subsidy. It has been built up and is sustained by the impelling force of American individualism. We have a seacoast longer than that of any maritime nation, teeming with productive communities and demanding the facilities of commercial intercourse. There is no richer source for the transportation of passengers and property. The opportunities have been great and American initiative has seized them freely and efficiently. The only contribution of the government has been in the preservation of this American trade in American ships. That governmental policy has been adhered to through all our national life against every effort to break it down. It is an essential national policy.

From the example before our eyes today, we learn the pleasant lesson that our coastwise service is not stagnant, but is alive and growing, and that the men who conduct it are appreciative of their duties in public service. Twenty years ago the Matson Navigation Company, whose guests we are, held an unimportant place in ocean navigation. It owned only four small vessels, all plying between our Pacific Coast and Hawaii. All of them together did not approach in tonnage the single ship whose launching we are celebrating. In type and in construction, in convenience and safety, they could not be mentioned in comparison. Mechanical development and marine engineering of the last twenty years have made this progress possible. The flag of the Matson Company now flies on a fleet of twenty fine vessels to which today we add the Malolo as its queen.

And there is in this a lesson for foreign trade—upon this solid basis of coastwise traffic, this company has also been able to enter and compete in foreign trade. And, in fact, one of our great hopes must be that our great transportation companies, builded upon coastwise traffic, will gradually extend into the foreign field.

This ship, today christened and devoted to the service of the American people, confirms our confidence in the ability of private enterprise to maintain for us a seagoing service of the finest improvement. I do not spreak of size alone, for while the Malolo will be one of the largest passenger ships in our domestic trade, there are others at least her equal in that respect, although only six American vessels exceed her tonnage. But in quality, embodying as she does every refinement which modern science can furnish, safety, comfort, and convenience, she perhaps stands for the moment preeminent among American vessels. Like all other things she will have her life, and her leadership will be wrested by later products of the skill of the marine architect; but she will give a long contribution to the secure and pleasant travel of our people before that day arrives. I give my heartiest congratulations to the company which owns the Malolo, whose vision and will to accomplish made her possible, to the architect who created her design, to the shipyard which constructed her, to the crew which will man her, and to the public which may have the good fortune to travel upon her.

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Malolo Prophetic

By P. S. Teller, United States Shipping Board.

COMING as I do from San Francisco, the home port of the Matson Navigation Company and of the American-Hawaiian Steamship Company, a port that is still my own home port and was always my residence, until they persuaded me to come to Washington, it gives me great pleasure to be here with and to compliment the people who have inaugurated and who have brought to its present stage such a fine vessel.

Speaking as a Shipping Board Commissioner, I feel that the building up of a merchant marine is vital. Our main trouble has been to get the ships into action and to get into the minds of the people an adequate vision of future needs and building therefor.

The building of this splendid express passenger steamer by private enterprise will do more to foster that vision and to awaken public pride in our merchant marine than could be accomplished by many years of political effort or postprandial oratory. I desire to commend the firms concerned and to express the hope that many others will follow their example.

I predict that Malolo will be a great success, a success even beyond the present beliefs of her owners, and that she will be the forerunner of a fleet of "flying fish" giving express passenger and freight service between the island empire of the Pacific and our own golden empire of the Pacific Slope.

The Purchasing Department of a Modern Steamship Company

By Hobart W. Mears, Purchasing Agent, Matson Navigation Company.

IN buying for a large steamship corporation the underlying thought should be to so regulate the work that a maximum of efficiency may be obtained with a minimum of labor. The first endeavor should be the organization of the department into a compact unit with no duplication of effort and at the same time develop sufficient and adequate records necessary to the proper consumation of the work.

A good price system is essential, such as is obtained with Rand or Kardex equipment, where one card is devoted to an item showing sources of supply, prevailing prices, and maximum and minimum quantities to be stocked.

A file of catalogs is desirable, also a system of indexing which will make the book requested available readily. The one big drawback in filing catalogs is the variety of sizes in which they are printed. And right here is a good place to commend the efforts of the National Association of Purchasing Agents in their endeavor to standardize these sizes, and it is urged that all firms who are contemplating issuing a catalog confer with their local association before letting the contract to their printer. When the writer attempted a classification the sizes ranged from 3 by 6 to 14 by 20 inches. A system was worked out giving a group letter to a range of sizes so that books of similar dimensions were filed together numerically. For example, sizes from 2½ by 4 to 3 by 7 were given the group letter A, and a block of numbers 1 to 100 assigned to that group. Then the whole file was cross indexed by firm and commodity.

Stocks and Storerooms.

Where a storeroom is maintained it should be under the supervision of the purchasing department, for the two activities are very closely related.

There is no question but that the system of storekeeping as established by the railroads and found practical over a long period of years is the only method to adopt. A trained storekeeper can do much to assist the purchasing department in keeping stocks down to a minimum and he can suggest ways of standardization as they may come to his attention. One important detail which was worked out satisfactorily in our own company was the elimination of dead stocks aboard vessels, with a wonderful resultant psychological effect on the men in the knowledge that their stocks would be checked periodically.

Buying to Sample.

The one bug-bear with which we have to contend is the insufficient description of articles ordered, which very often necessitates a salesman going to the vessel to determine just what is wanted, with the resultant loss of time and incidental increase to the sales expense. I think that if everyone would endeavor to eliminate, as far as possible, this one feature in buying it would tend to cut down some of the "per cents" in sales costs; furthermore I think it should be a matter of pride with every purchasing agent to have his requisitions go out to the various firms with as full descriptions as possible; in other words, make them think that you "know what it's all about."

Deliveries.

Where a storeroom is maintained, all deliveries of merchandise should move through this channel and there be directed to its proper destinations aboard the vessels. With this method a copy of the purchase order goes to the storekeeper, so that he may be informed as to what has been ordered and when delivery is required, and can thus know when all stores have been received. If it were possible to bring the various firms to the realization of how important it is to the efficient operation of vessels to have deliveries on time we could go a long way in perfecting an organization.

There are certain hours allotted to the loading of stores aboard ships by the stevedores; there are three departments on a vessel, and sometimes supplies are being received for four or five steamers. When it is considered that the supplies have to be inspected, counted, weighed, and checked against the requisition it can be very well imagined what happens when deliveries start to overlap, with the resultant fireworks set off by a bunch of teamsters all clamoring to have their supplies accepted at the same time.

Paint Specifications.

There seems to be some diversity of opinion as to the efficancy of paint specifications. Most of the large railroads have their paints made by specification, and some steamship companies have tried it but after some experience discarded the idea, due in part no doubt to the absence of laboratories and proper means of testing the various samples over long periods of time. After all is said and done, the main object in applying paint is preservation of the surface, appearance, and durability; if these points are accomplished what difference does it make as to the component parts, the vehicle, and pigment?

A responsible manufacturer is not so short sighted as to deliver an inferior product thereby losing a valuable account; and if the buyer will forget for the moment "the dollar in sight" and go to the manufacturer with his problem, the manufacturer will be only too happy to help solve the difficulty and the ultimate result will be satisfactory. Where is the economy in paying $1.50 per gallon for paint which has to be renewed every month, when for $2.50 a gallon the life of the product is increased to nine or ten months?

An eminent chemist has stated that the published methods for varnish analyses are not worth the paper they are written on and further that chemical specifications are rapidly being superseded by physical specifications.

Conclusion.

It is impossible for a purchasing agent to have a complete knowledge of everything he buys except where the department is divided so that one man may specialize on a small group. So it behooves us to make our selection of sources of supply among well established and reputable firms and to be guided to a large extent by their better knowledge of the products which they manufacture.

The Present Status of American Shipbuilding

By J. Harry Mull, President and General Manager,
The William Cramp & Sons Ship & Engine Building Company.

THE present plight of the shipbuilding industry with its many large-scale economic readjustments is the inevitable result of unsettled conditions and the lack of a definite maritime policy on the part of the nation.

The most important factor operating against the American shipowner today is the difference in capital outlay at the beginning of his investment and the resultant higher interest, depreciation, and insurance charges, as compared to the lower first cost and operating overhead for the same ship abroad. This higher first cost is due directly to our protective tariff, which induces a higher standard of wages and imposes greater expense for the material that goes to make up the component parts of the ship, but does not offer the same compensating advantages to shipbuilding that it does to other American industries. Extension of the principle of tariff protection to shipbuilding would offset these handicaps and thus remove the most perplexing of the obstacles that have proved so irksome in maritime competition for American shipowners.

Increased working forces in American shipyards, the recent placing of several important awards for new tonnage, and the number of contracts now pending are signs that may erroneously be taken as indicating a revival in shipbuilding in this country. When one considers, however, that any two of the larger shipyards could easily handle all of the new construction now under way and expected to be contracted for during the remainder of the year, it becomes evident that any real improvement in the industry must await developments of the future. Such developments rest largely with Congress and its solution of America's shipping problem.

A definite national policy in shipping affairs is a necessary development of the future which is certain to stimulate the interest of the American people in the possibility of utilizing the great facilities possessed by this country for the construction of new tonnage, and in helping create a demand for ships built by American workmen in American shipyards.

It is true that for the first time in six years some of the shipyards have taken on additional workers; but it must be remembered that during the same six years the working forces were depleted by the staggering effects of a depression which showed a decline of more than 97 per cent in the shipbuilding product of the nation and which only lately took a slight upturn just before reaching the irreducible minimum. It probably is not generally known that a large volume of the very small amount of construction now under way in American shipyards was taken by the successful bidders under the keenest kind of competition by companies that were willing to accept little or no profit, and in some instances actual losses, rather than close down completely.

At this time, when shipping legislation is undergoing analysis and revision in order that it may meet the requirements of the future, cognizance must be taken of the importance of the shipyards in restoring the American flag to the seas. Adequate shipbuilding facilities are necessary to carry out the expressed purpose of Congress, which in the preamble to the Merchant Marine Act of 1920 declares: "It is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency * * * * and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine."

Three major reasons why the shipbuilding industry cannot maintain itself on the business at present available are:

1. Curtailment of construction in private yards for the United States Navy as a result of the armament treaty, the effect of which is obvious considering the fact that 60 per cent of the pre-war production of the shipyards was taken by the Navy Department.
2. Curtailment of building for coastwise trade due to the surplus of Shipping Board tonnage.
3. Inability to replace shrinkage of tonnage referred to because of higher costs of constructing ships in this country than abroad. This condition has resulted in certain American concerns contracting with foreign yards for the construction of 26 vessels during the past few years for use in foreign trade aggregating approximately $50,000,000 worth of work, which could just as well have been done in American yards and would if there was anything like an equivalent basis.

To make it possible for ships to be built in American yards for use in foreign trade at an equivalent basis with the ships with which they necessarily compete, and to insure the replacement of vessels now being used, suitable legislation should be adopted on the following principles:

a. That an American-built ship, for use in the foreign trade, is, of its essence, an export commodity and entitled to the protective policy applied to its necessities as long as protection is the accepted policy of this nation. It has no market in domestic trade unlike other commodities.

b. That an American-built ship in international trade is living its life essentially outside American territory and is in unrestricted and unprotected competition with all foreign ships (no matter how low their standards of wages, personnel, equipment, or safety) and is entitled to the refund principle as existing in our protective tariff principle.

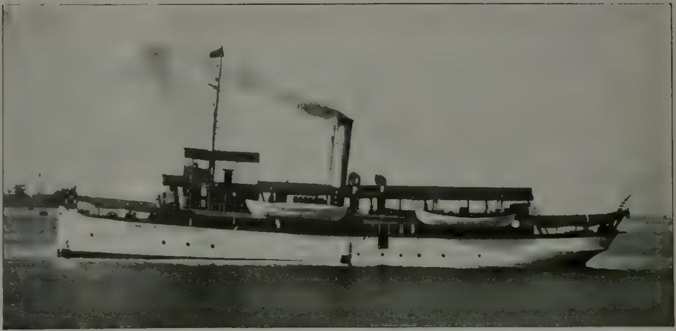
c. That such refund shall be the amount of the tariff on the component elements of a ship deducted from the whole price of the ship.

d. That such export commodity refund shall apply to the actual American shipowner of such ship as certified by the Treasury Department.

e. At the time of building, charter rates shall be contracted for between the United States Government and the owner of the ship, based upon the factors of age and depreciation at the time of the Government requisition of the ship; the vessel being the security

(Continued on Page 357.)

Coast Survey in the Philippines



United States Coast and Geodetic Survey steamer Romblon at work in the Philippines

THE Director of the United States Coast and Geodetic Survey recently issued an interesting story by Donald Edward Keyhoe describing a few of the difficulties and dangers encountered by the officers and men of the Survey in charting the coasts of the Philippine archipelago.

Moro pirates chase off the Filipino land parties left in charge of shore stations, tear down the triangulation markers, and make off with everything portable around the stations. Great trouble is experienced in overcoming superstitious fears of the natives over every natural obstacle. These fears often lead to desertion on the part of native carriers and consequent delay to the survey work. The following extracts from the story of Mr. Keyhoe show some of the major difficulties.

The island surveyor is a brother to the explorer. In the survey of Camiguin Island, Lieutenant Studds came across evidence of Chinese occupation dating back to the ninth century. Odd Chinese burial pots, containing only heads and shin bones, were discovered in one spot. Not far away were stone steps which are believed to have led to an old Chinese temple. This island is thought to have been a refuge for Oriental pirates somewhere about 1000 A. D.

On another island Lieutenant Studds established a small station beside which he intended to pitch camp a little later. On his return the station and surrounding area had been buried deeply under ashes from a nearby volcano.

Living inside the crater of an extinct volcano, with the dubious companionship of rock-cobras and large mountain rats, was the experience of another Survey officer and his party. During a four-week stay they worked almost in the shadow of another volcano, disdisconcertingly active with its continual rumbling and choking clouds of sulphurous smoke.

Down in the Sulu archipelago, and in the southern parts of Palawan and Mindanao, there is still some danger from the fiercer Moros, although the dreaded "juramentado" has been almost stamped out. This unpleasant custom consisted of taking a solemn oath to die killing Christians, which was supposed to brighten the prospects for high station in the world to come. The Moro desiring to commit suicide in this manner would go through certain sacred rites, including shaving off his eyebrows and dressing in white, after which he would conceal a kris or barong about his body and try to steal into a Christian town or settlement. He would then snatch out the weapon and slay everyone within reach, keeping up this fanatical slaughter until he was himself destroyed. The greater the number of his victims, the greater glory to which he would attain after death. The increase of this fiendish killing led to stern measures even in the days of Spanish occupation, but not until a comparatively recent time was it effectively checked.

Poisonous reptiles and voracious fish add to the difficulties of surveying in the Philippine Islands. Not long ago an officer was seized by a huge crocodile as he stepped from a launch to wade ashore. But for a stanchion which prevented the jaws of the monster from closing entirely, the officer's leg would have been completely mangled. Quick work by sailors saved him, but a severe injury had already been inflicted.

Typhoons, feared even by large vessels in those waters, are ever present sources of danger to the small ships of the Coast and Geodetic Survey. Each of these has weathered at least a single typhoon, and some of them have passed through three or four. The Pathfinder had the unique experience of being directly in the center of a typhoon. As the center approached the terrific wind abated, and there came a peculiar lull. Within a few minutes a swift reversal of the gale sent the ship heavily against her anchor chains, which snapped like cord. The tidal wave that followed carried the helpless vessel far inshore, where she came to rest among the cocoanut trees.

Yet within a few days the staunch little ship was preparing to resume her duties exploring the little known waters of the archipelago, that others might go safely along the once feared coasts.

Europe's Trade Problem

HOPEFUL signs of improvement in Europe's economic condition are seen by Basil Miles, American Commissioner to the International Chamber of Commerce in Paris, in a review of the situation for the month, but as the business horizon clears, it brings into sharper outline the big general problem with which the continent will have to deal.

"As the general level of business is gradually raised," says Mr. Miles, "now here, now there, the new field of modern business comes feature by feature into view. When the level is stabilized, the grand problem will then appear in its true proportions: how can Europe with its 21 frontiers bristling with barriers to trade, compete as a whole with the uninterrupted field of production in the United States where 48 frontiers have been broken down and commerce travels back and forth on even terms over an area nearly as great as that of all Europe?"

Cargo Stowage

Some Observations on One of the Most Vital Factors in Successful Operation of Merchant Vessels

Norman F. Titus, Manager, Claims—Insurance,
McCormick Steamship Company.

ONE of the most vital factors in the shipping business is the question of the proper stowage of cargo. In itself, stowage is nothing short of an art. With the increasing complexity of modern business, vessels are being constructed of greater size and cargoes are becoming more and more diversified. Aside from the practical operating problems it must be borne in mind that probably sixty per cent of cargo claims are due to poor or imperfect stowage.

The seriousness of the problem arises from the fact that conditions are never ideal, and, as a result, the pier superintendent, stevedore superintendent, and chief mate have many knotty problems to solve at the last moment. It is difficult enough to plan the stowage of a large steamer, dovetailing together the infinite combinations of deadweight and measurement cargo, but often the problem is intensified by loading at several ports and discharging at an equal number. Very naturally, the heavy cargo should be stowed on the bottom with the lighter cargo on top. Then again, consideration must be given to the necessity of proper order of discharge at destination, with the further obligation that on leaving any port the cargo remaining must be so stowed as to provide safety to the cargo itself, combined with the necessity of not producing any undue strain on the ship by improper distribution of weights of the cargo remaining on board.

The subject of stowage, very naturally, is an intricate one but, in a general way, it can be classified according to the principles involved as follows:

(1) Stowing to secure maximum weight and volume.
(2) Stowing to prevent damage to ship or crew.
(3) Stowing to avoid damage to the cargo.
(4) Stowing to secure maximum speed and minimum cost.

A study of stowage therefore, involves a careful examination of each of these factors.

I. Stowing to Secure Maximum Weight and Volume.

A ship properly stowed is filled completely and carries weight enough to wet her marks. If she is not completely filled, the cargo will not carry well, but will shift with the ship's motion at sea and perhaps damage the goods or endanger the vessel. If not completely weighted she will not sail efficiently or, perhaps, even safely. And, on the other hand, if neither maximum volume nor weight is carried the vessel will not earn maximum revenue for the voyage.

The great traffic problem in the steamship business is to get the ideal combination of volume and weight.

To illustrate, take a ship of 6000 tons weight and 300,000 cubic feet capacity with several arrangements of cargo.

Cargo No. 1. 6000 tons of copper ingots at $5 per ton $30,000; but as copper stows 10 cubic feet to the ton, the vessel will thus have a full cargo by weight, but will have utilized only 60,000 cubic feet of its total capacity of 300,000; that is, it will only be one-fifth full.

Cargo No. 2. If, however, the vessel took full cargo of cotton of $5 per ton measurement she would have 7500 cubic tons cotton (300,000 feet capacity divided by 40 cubic feet, ton measurement) at $5—$37,500.

Cargo No. 3. By combining both of the above commodities we could stow a cargo as follows:

3000 tons copper (30,000 cubic ft.) at $5—$15,000
3000 tons cotton (270,000 cubic ft.) at $5— 33,750

Total $48,750

Cotton stows 90 cubic feet to the ton. 40 cubic feet equals one ton measurement. Rate of $5 is for 40 cubic feet—1 ton measurement.

In the latter case it will be observed that we had full capacity—weight and measurement—6000 tons and 300,000 cubic feet. This means that the vessel was fully laden and, at the same time, down to her marks.

Summary. It is interesting to compare the revenue of these three cargoes:

Cargo No. 1 6000 tons weight revenue $30,000.
Cargo No. 2 7500 tons measurement revenue 37,500.
Cargo No. 3 3000 tons weight
6750 tons measurement revenue 48,750.

Formula for Stowage for Maximum Revenue. In order to determine the exact proportion of weight and volume cargo to secure maximum revenue the following formula may be used:

$$X=\frac{\left|\frac{V-a}{T}\right| T}{b-a}$$

In which—

X=number of tons taken of the lighter of the two commodities
V=cargo capacity in cubic feet
T=total number of tons cargo that can be carried (deadweight tonnage less tonnage of fuel stores ,etc.)
a=stowage factor of the heavier commodity
b=stowage factor of the lighter commodity.

Illustration:—Assume a vessel is of 6500 tons and has cargo space of 360,000 cubic feet, and fuel and stores weigh 500 tons. It is proposed to load her with weight cargo with a stowage factor of 20, and measurement cargo with a factor of 80.

$$X=\frac{\frac{360{,}000-20}{6000}\,6000}{80-20}=\frac{(60\text{-}20)6000}{60}$$

or X=4000 tons measurement cargo.

Transportation of Commodities with Unsatisfactory Relation Between Weight and Volume: Special conditions arise in the transportation of commodities with stowage factors either above or below normal. This situation is generally met by a special design in the vessel, as for instance, the steam schooner on the Pacific Coast, which is peculiarly adapted to the transportation of lumber with a huge deck-load. Just the reverse of this situation involving a commodity of greater relative volume than weight is that of the Chilean ore carrier, where the volume is small and the weight very great. In this latter case, the ore vessels are constructed with double bottoms, the bottom of the cargo hold being raised 17 feet above the keel to raise the center of gravity. To contract the hold space, the hold breadth is made one-half the beam of the vessel.

Routing to Satisfy Cargo Needs: This is well illustrated by sailing vessels that load iron ore or salt in one port of Spain or Portugal and cork another; thus giving them a well-balanced cargo. Such an arrangement is not adaptable to a steamer, for the cost of separate port loadings is prohibitive.

Improvement in Packing and Stowing: In the future, difficulties caused by unusual stowage factors must be overcome largely by improved methods of packing and stowing. Possibilities in this line were demonstrated by the army during the transportation of supplies overseas during the war. They accomplished wonders in the matter of improved packing. Just to cite one instance, the 5-ton Packard truck when packed for shipment occupied 1000 cubic feet. After the packing division had finished their experiments, they produced a method of packing the truck in a crate to occupy 268 cubic feet. They also secured wonderful results in baling clothing instead of boxing it. On this clothing item they saved $49,000,000 in freight rates alone, due to economy of space.

In the packing of cotton there is considerable divergent practise. The stowage factor of the American standard bale averages about 125. If we compressed our bales to the same density as those shipped from China and India, the stowage factor would be about 50, in other words, there would be a sixty per cent saving in ship's space. The reason American cotton is not compressed to a greater amount is due to lack of facilities, and principally to the fact that much of it is packed damp and, if more heavily compressed, it would be difficult for the manufacturer to spin it.

The government has spent much time and money on this problem. The Department of Agriculture has laboratories for the study of proper packing, and the War Department has also thoroughly investigated this matter and has issued several manuals on the subject for guidance in packing army stores.

Broken Stowage or the unfilled space between articles is one of the serious problems of the stevedore. Great care and foresight on the part of the traffic department is necessary to provide cargo that can be utilized for broken stowage. Cases of canned goods, binder twine, etc., make splendid small stowage. In full lumber cargoes it is quite customary to secure short stowage in specified amounts at half rates. On a very large number of articles, broken stowage runs as high as 25 per cent. All stowage books give elaborate tables on this feature.

Planning the Stowage: In practically every steamship line, detailed cargo plans are made and hatch lists with car numbers furnished the stevedores. (In some cases the stevedore superintendent does this work from the record of booking contracts furnished him by the Traffic Department).

II. Stowing to Prevent Damage or Danger to the Ship or Crew.

A vessel may be damaged, its efficiency may be impaired, and its life and that of its crew be endangered by improper stowage. The particular features of this phase of the subject are—

(a) Damage Caused by Improper Vertical Distribution of Weights: Improper vertical distribution causes damage largely because of its effect on rolling. Rolling, or the movement of the vessel from side to side, results in injury to the ship, damage to the cargo, and loss of speed. If excessive, it may lead to the foundering of the ship. Because of its importance, and because it can be controlled in part by the distribution of the cargo, the shipowner and the stevedore should understand its causes and the means taken for its reduction.

There are two distinct problems here. One is the problem of stability and the other the amount and speed of rolling, or, in other words, one is the danger of capsizing the ship and the other the damage done by excessive rolling. The fact that a ship is stable does not mean that it rolls relatively little. In fact, quite the contrary may be true.

Stability: With modern ships it is not easy to practise stowing methods that will destroy the stability of the ship. But even now some ships may be easily upset by poor stowing, combined with bad weather, while almost all are endangered by grossly careless stowing. The whole problem revolves around the proposition of the relation between the center of gravity and the center of buoyancy. In general features to consider in this connection are as follows:

(1) The height of the metacenter depends largely upon the beam of the vessel, and as alteration in stowage can make no change in the beam, the ship's officers need not consider this factor directly.

(2) The change in the position of the center of buoyancy depends primarily on the freeboard of the vessel, in other words, upon the loaded draft. The minimum freeboard is fixed by classification societies, and the maximum requirements of revenue, because if the freeboard is too large the vessel will not produce the maximum revenue.

(3) Changing the postion of the center of gravity is the most important way of changing the ship's stability and is, at the same time, the method that is most under the control of the master of the ship. In a merchant vessel the position of the center of gravity depends very largely on the disposition of the cargo, ballast and stores. If most of the weight is low in the hold, the center of gravity will be low, the lever long, and stability assured. If the weight of the cargo is placed high, or if there is very little weight to the cargo, the center of gravity will be raised, the righting lever shortened, and the ship's stability endangered.

Rolling is greatly affected by stowage and, if violent, may cause damage to cargo, strain the structure of the ship and cause leakage, decrease the speed, loosen the ropes and stays, and may even cause the masts to break off. Many vessels have been damaged and many lost at sea because their righting forces were too powerful. In general, excessive rolling is prevented by:—

(1) Stowing the heavy cargo as much in the wings as possible.

(2) Decreasing the righting by increasing the height of the center of gravity. In most modern ships this is taken into consideration in the design. In many vessels however, it is necessary to prepare stability curves, and watch the stowage very closely.

(b) Damage Caused by Improper Longitudinal Distribution of Weights: The distribution is improper if

(a) it results in putting the vessel out of trim, or if (b) it keeps the vessel in trim, but is so uneven that strains are set up. On account of the way in which the vessel is constructed it is very easy to stow the cargo in such a way that both adverse results are obtained.

The matter of trim is readily understood but is one that requires careful attention. If most of the weight is placed amidship, the strains may lead to the "buckling" of the ship. If, on the other hand, all of the weights are placed at the two ends, violent pitching is encouraged and the result may be the hogging of the ship.

(c) Damage Caused by Improper Transverse Distribution of Weights:

(1) **Listing:** By improper loading athwartship a list may be produced. This will result in retardation of speed, in strain, and sometimes in capsizing.

(2) **Transverse Strains:** If weights are not uniformly distributed, strains will be set up between different parts of the bottom.

(d) Damage by Shifting of Cargo: There is always danger of the cargo shifting as long as there is empty space within the hold, or so long as the cargo is not adequately partitioned off from the hold. It may shift in any one of a number of directions—vertically, longitudinally, or transversely. It is quite necessary that every precaution be taken to prevent shifting of any sort. The best preventive, of course, is to leave no space into which cargo may shift. It is primarily for this reason that efforts are made to stow very compactly and completely.

This subject is a very large one and the individual examples are very interesting. However, the following precautions to prevent shifting are quite illustrative:

(1) If possible, leave no space into which cargo may shift.

(2) If there is space left, the cargo must be so thoroughly shored or secured that it cannot move under any probable circumstances.

(3) If the cargo will settle, some provision must be made to secure it after it has settled, or to feed more into the empty space.

(4) With articles subject to crushing, such as barreled goods, the stowing must be very carefully done.

(5) If there is no way to prevent shifting, the shift must be confined to a small space, so that little damage will ensue. Thus, in cargoes of grain, or like commodities, shifting boards are used to divide the hold into small compartments.

(e) Damage Caused by the Character of the Cargo: There are a great many commodities of such nature that their carriage endangers the health or life of the crew and passengers and the safety of the vessel. For example there are classes of goods that produce dangerous dusts or odors and those that are liable to spontaneous combustion; further, there are the ones that are inflammable, explosive, or poisonous. In addition to these there are the special classes, as:

(1) **Articles That Lose Weight or Volume:** Articles of this class and approximate loss of weight, are:

Bones	5 per cent
Guano, hides	3 - 6 per cent
Molasses	15 per cent
Nitrate of soda	3½ - 5 per cent
Potatoes, pig iron	1 - 2 per cent
Rice	8 per cent
Saltpeter, silk	4 per cent

In a few cases where the percentage of loss is very high, the stowage may be altered enough to entail some danger or damage by changing trim or by permitting shifting. Thus, salt in bulk may, under very unfavorable conditions, be dissolved in such large quantities that the cargo will shift. But more serious than this possibility is the damage done to the ship by the wasting processes, particularly the rusting of metallic parts due to moisture from wasting commodities, the choking of the limbers and pumps by the waste products, and the coating of dirt or grease that must be cleaned from the hold after the discharge of cargo.

(2) **Articles That Gain Weight or Volume:** Articles in this class gain weight or volume largely by the addition of water. Some articles absorb moisture from the air. Ordinarily there is no danger to the ship in this, but if the additional weight or volume becomes very great, some harm may result. Coke and charcoal may gain twenty per cent in weight by absorbing moisture and a vessel laden with one of these articles may become overloaded on the voyage and be in danger of capsizing. Perhaps grain is the best example of a commodity that may gain so much volume, under the influence of heat and moisture, as to become dangerous; but this swelling is in almost all cases offset by the settling of the grain.

III. Stowing to Avoid Damage to the Cargo.

This is a very important matter, for under the bill of lading the shipowner is absolutely liable in case of negligence. Liability may arise from the following:

(1) **Wear and Tear in Loading and Unloading.** The most common damage arises from tearing by hooks, fragile and heavy cases in one sling, careless handling of the tackle, breaking of tackle, loss of small articles, carelessness in sorting and piling, and improper protection from the weather.

(2) **Chafing:** The ship's motions are so varied and great that there is much danger of chafing. Chafing will injure many commodities, especially those packed in fragile containers or not covered at all. Stationery, silk, fruits, glassware, rope and cordage, and machinery are among the articles that are especially subject to damage in this way. Bulk cargoes are also injured by chafing. Chafing may generate such heat as to ignite matches or oily fibers and thereby endanger the whole cargo.

It is impossible to entirely eliminate chafing; but it can be reduced to reasonable limits by careful stowage. The remedy is the same as to prevent shifting of cargo; that is, the cargo must be packed so tight that it cannot move even when the motion is violent. Among the many methods for preventing chafing are pieces of wood, bedding, quoining, chocking and wedging, and also shifting boards.

(3) **Crushing:** Crushing of goods or their containers may be the result of carelessness or unavoidable accident in loading or discharge, or bad stowage in the hold, or of inadequate packing. One of the principal causes of crushing is the placing of heavy freight on top of light cases, crates or barrels. Of course, one of the best measures to take to avoid crushing is to carefully select the part of the ship into which the goods are to be stowed. Ordinarily the 'tween-decks offer the most protection.

(4) **Moisture:** Moisture is perhaps the element that damages the most cargo. There are many ways that moisture may originate; for instance from wet

goods stowed in the hold or on one of the decks; it may leak through the bottom, the sides, or from the tanks; it may pass down from the decks in stormy weather, or when the decks are washed; it may spring from a leak in a steam or water pipe; it may be condensed from the steaming cargo on the beams or deck floor and then fall on the cargo; or it may be present in the air itself.

One of the most noticeable facts about the presence of moisture is the fact that it may cause fermentation, heating, and sweating of some commodities. The sweating that results is not always the most serious consequence. The goods themselves may be, and often are, rendered entirely worthless and, in many cases, heating will result in spontaneous combustion and destruction of the vessel.

(5) **Heat:** There is an enormous amount of damage to shipments of goods by excessive heating, caused by:

(a) high air temperature on tropical voyages, especially pronounced if there is lack of ventilation in the hold;

(b) exposure of goods to the hot rays of the sun;

(c) exposure of goods to the heat of the engine and boiler rooms or steam pipes;

(d) spontaneous heating of commodities.

(6) **Frost:** There is little danger from frost except for dangerous goods, like acid, that must be stowed on deck. Bulk cargoes or coal or iron ore are not easily discharged if the water they contain is frozen, and it may be necessary to use steam to thaw them out.

(7) **Evaporation:** Almost all classes of wet goods are subject to loss by evaporation. In some cases this loss may amount to from five to ten per cent, or even more. Wet goods should be kept moist and cool by stowing in the 'tween decks, in the bow, etc., and away from drying articles like oatmeal, calcium chloride, etc. Heat not only aids evaporation but it will cause breakage of glass containers and the starting of the staves of wooden ones, thus resulting in breakage and greater loss.

(8) **Pilfering:** The loss from pilfering in certain trades is one of the most serious met by the shipowner. Due to the moral let-down due to the world-war, pilfering immediately thereafter was about twenty times as great as before the war. It is now getting more under control but is still a great menace.

(9) **Lack of Ventilation:** A poorly ventilated hold is apt to become wet and warm and to promote damage by moisture, heat, odors, vapors, and gases. A draft of air will serve to cause evaporation of excess moisture, lower the temperature and remove foul odors and gases. Ventilating can best be secured by keeping the hatches open in clear weather, and by adjustments of the height and direction of the ventilation funnels.

(10) **Vermin:** Most old ships are infected with vermin of different sorts—rats, mice, roaches, ants, lice, etc., and it becomes increasingly difficult as time goes on to control them or their ravages. The best remedies are keeping the ship clean and well ventilated and adopting well known safeguards as, for instance, putting rat funnels on all lines to shore, raising the gang plank at night, fending off the ship, frequent fumigation, etc.

(11) **Dangerous Goods** are legion. The principal classes are the goods liable to spontaneous combustion and malodorous goods. Furthermore, a large amount of damage is done by dusty goods principally in loading and discharging. Not only is dust troublesome and damaging, but it has also inflammable, explosive, and poisonous qualities.

In a general way, the importance of this feature of proper stowage to prevent damage to cargo is shown in the enormous claims that carriers have to meet. In the intercoastal trade, especially when it was new, damage frequently amounted to $5000 per voyage. It is now much less, but still altogether too great. A recent notorious case was that of a well-known company, not in the intercoastal trade, however, which was presented with claims amounting to $62,000 on the discharge of one of their ships due to the cargo consisting mainly of four commodities, stowed as follows: Lard substitute in barrels stowed on top of coffee, and pig iron stowed on top of victrolas.

IV. Stowing to Secure Maximum Speed and Minimum Cost.

A great deal of care must be given the question of stevedoring costs and the general overhead expenses of the vessel to estimate exactly how many men to use and how much overtime to work. Experience is the best teacher in these matters.

This is a very big and important subject, however. As for methods for securing speed and economy, the following are the principal factors:

(1) Prompt and proper assembling of the cargo on the pier;

(2) Adoption of efficient methods of moving cargo to the pick-up place;

(3) Adoption of efficient methods of separating and stacking discharged goods;

(4) Adequate lighterage service for offshore receipt and discharge;

(5) Standardization of equipment for loading;

(6) Use of all hatches;

(7) Adoption of the most efficient methods for stowing goods in the hold;

(8) Increasing the productivity of labor;

(9) Harmonizing the design of the vessel with the requirements of the cargo handled.

Business Arbitrates

ARBITRATION, as a method of adjusting trade controversies and as an instrument of self-regulation, is found to be a rapidly growing institution in American business by the Domestic Distribution Department of the Chamber of Commerce of the United States.

An analysis of 16 typical arbitration systems now functioning, made for the National Trade Relations Committee shows that compulsory arbitration is enforced by the American Spice Trade Association, the Grain Dealers National Association, the National-American Wholesale Lumber Association, the National Council Lighting Fixtures Manufacturers and the National League of Commission Merchants.

The food group, consisting of the American Wholesale Grocers Association, the National Canners Association, the National Dried Fruit Association, the National Food Brokers Association and the National Wholesale Grocers Association, has adopted uniform arbitration rules and maintains joint arbitration boards in the principal cities of the United States.

The leather group, consisting of the Tanners Council and the shoe manufacturers, wholesalers and retailers associations, also has adopted uniform rules.

The Harbor of Saigon

By G. Girard, Commercial Attache for French Indo-China to the United States and Canada.

SAIGON, the principal city of French Indo-China, is situated on a river of the same name about fifty miles from the sea. By a recent uinon with its sister city Cholon, it has become one of the great commercial French cities of the world, ranking as the third French port after Marsailles and as the eighth port in commercial importance in the Far East.

The city is very well laid out, with broad boulevards, and occupies a situation of great natural beauty. The river forms a deep water way, navigable for the largest passenger steamers, and the Oriental liners of the Messageries Maritimes call regularly at the port. The annual clearances aggregate better than two million gross tons. There is regular direct communication with all French ports, and with Hongkong and Singapore through British lines. There is much need of American cultivation of this territory through direct communication with Manila.

Messageries Maritimes quay at Saigon, showing large liner alongside.

The chief exports are rice, fish and fish oil, pepper, cotton, copra, silk, shrimps, isinglass, hides, and cardamons. The total foreign trade of the port is valued at about five hundred million francs, and the new city of Saigon-Cholon boasts of 300,000 inhabitants, about 7000 of whom are Europeans, exclusive of the military forces. There are about 70,000 Chinese in the city, the balance of the population being Annamites.

Landing and handling facilities at the port of Saigon are very excellent and are equipped with modern machinery. All liners dock at the quays in the heart of the city. There are nearly two miles of stone and concrete quays equipped with warehouses, cranes, and other facilities and anchorage and berthage are available for fifty large ships simultaneously without crowding. Day and night service is provided at all quays, so that ships are dispatched promptly, and the port is achieving a reputation for quick loading and discharging of vessels.

The principal product of French Indo-China is rice, a very large proportion of the cultivated area of the country being devoted to this cereal. The rice mills of Saigon

ORIENTAL CONTRASTS

In many of the ports of the Orient are seen striking contrasts between modern transportation methods and the age-old delivery systems of the Orient.

Above is shown the delivery of bamboo timber in rafts on one of the river fronts at Saigon. At the right are shown Chinese river junks delivering raw material to a modern French factory. Contrast these pictures with that at the head of the page.

DEEP WATER

One of the great advantages of Saigon and the other ports of French Indo-China is deep water alongside the quays. This is strikingly illustrated by this photograph of a large French battle cruiser at anchor on the Saigon river front. The large ocean liners of the Messageries Maritimes discharge passengers and freight directly on to the quay in this harbor, four hours steaming distance from the mouth of the river.

and Cholon have a combined capacity of approximately ten thousand tons a day. About one million kilograms of raw silk are produced annually in the Province of Annam, about one-third of which is exported through Saigon and the balance used in native manufactures.

The river and coast fisheries are carried on largely by the old native methods. There are some 75,000 boats engaged on the rivers and on the coast tributary to Saigon, and the annual fisheries products are valued at three and one-half million francs.

French Indo-China is divided into three main economic areas. The territory tributary to Saigon, aside from the fisheries mentioned above, is largely agricultural, being one of the greatest rice regions of the world. Second, the territory tributary to the port of Haiphong, which is devoted largely to mining and manufacturing as well as agriculture. And third, Central Annam, with Tourane as the principal port, which is agricultural, growing mainly cinnamon, sugar cane, and tea.

There are large mineral products in Indo-China, including coal, lignite, antimony, tin, wolfram, and zinc.

The territory is exceedingly interesting from a tourist's standpoint, not only on account of the many beautiful rivers and waterfalls and the magnificant drives laid out by French engineers, including the famous Mandarin Road, but also on account of the wonderful ruins of ancient temples, which have become almost a Mecca for archeologically inclined tourists.

The commercial fleet of native boats carrying on the fisheries and river and coastwise trading in French Indo-China is an almost virgin field for the introduction of gasoline and diesel engines of the type which is becoming standard for the propulsion equipment of workboats on the Pacific Coast. In a few instances progressive Chinese traders in the East Indies and in the vicinity of Shanghai and Canton have equipped their craft with internal combustion engines. As noted above, there are some 75,000 native boats engaged in the waters of French Indo-China. Probably twenty-five per cent of this fleet is a prospective market for the internal combustion engine.

MORE CONTRASTS

Above is shown a typical French Indo-China market street, the Street of the Potters. Here the Oriental merchant displays his ware for sale in open storage. Contrast this with the scene at the left showing the French Boulevard Chantier with its beautifully kept parkings, wide, smooth pavement, and comfortable homes set well back from the sidewalk line.

PUBLIC LIBRARY

Marine Oil Engine and Motorship Progress

Progress in Marine Diesel Engineering

Brief notes on Recent Developments in Design and Construction of Oil Engines and Motorships

SOME years back, in reviewing the progress of the diesel engineer in the marine field, Pacific Marine Review registered the opinion that one of great contributions made by that branch to the progress of the profession as a whole lay in the tremendous competitive stimulus given to steam marine engineering by the success of the diesel. Recent developments in Great Britain confirm this opinion. There much of the discussion in recent meetings of engineering bodies has centered around the application of high pressure, high superheat steam to marine propulsion, and it is very noticeable that the proponents of this medium are intensely interested in showing up the shortcomings of the internal combustion engine.

On paper the figures as handled by an expert like Sir John Biles show that the high pressure turbine installations have a decided advantage in over-all economy under all ordinary conditions of voyage. Sir John's most recent paper on this subject was read at the summer meetings of the Institution of Naval Architects held at Antwerp, Belgium, on June 22, 1926. It is a matter of regret that there were no proponents of diesel propulsion or any diesel engineering experts present at this meeting and that there was, therefore, no discussion to expand and draw out the finer points of the comparison. One diesel engineer was unkind enough to say that the diesel engineers were all so busy installing marine plants that they had no time to attend such meetings; whereat a steam man comes back with the remark that the diesel men are taking jobs at such figures that there are no profits upon which they might draw for transportation. Be that as it may, and getting back to our starting place, we now venture to predict that the chief value to the progress of marine engineering in the introduction of high pressure steam will be the stimulus to the diesel engineer, who will now be forced to standardize the marine diesel power plant and cut down first costs for the shipowner.

At the present time both in new construction and in operation, the diesel has much the better position in the argument. There is not a motorship among all the thousands of idle vessels laid up in British and continental ports. Every large shipowner who has given the diesel a good trial has been converted himself and is rapidly converting his fleet. A very large proportion of all tonnage on order is for diesel propulsion, and the majority of the first class ocean going passenger liners now building are to be diesel driven.

Double acting two or four cycle units of 8000 to 10,000 horsepower are now almost standard equipment for large European passenger vessels. The M. A. N. double-acting type, 15,000-horsepower unit is operating satisfactorily in a Hamburg power house. It would seem that the diesel is ready to meet all practical requirements of marine power plants.

In Germany the tendency in modern motorships seems to be toward high speed light weight engines, geared to the propeller shaft through mechanical or hydraulic transmission, or through a combination of both those systems. Blohm and Voss of Hamburg use mechanical gearing with the pinion mounted on a hollow spindle driven by the shaft of the engine through a large flange, the engine shaft being extended inside the hollow spindle. This arrangement gives sufficient flexibility to cushion maneuvering and propeller shock and adds greatly to the flexibility and life of single reduction gearing.

The Vulcan Works at Stettin have worked out an excellent arrangement of Fottinger hydraulic clutches and mechanical single reduction gearing that is giving excellent service on several installations. This gear reverses with the hydraulic clutch and gives

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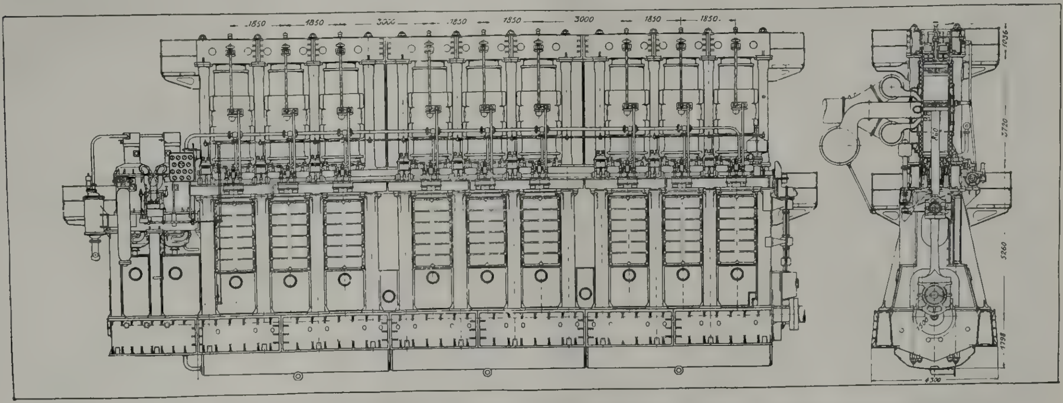


The most powerful diesel engine in the world. Elevation and cross-section of the 15,000 horsepower M.A.N. double-acting 2-cycle type unit now operating in the City of Hamburg.

Motorship Fuel Systems

A Few Practical Notes from the Viewpoint of the Engine Room

By **Robert C. Pairman.**

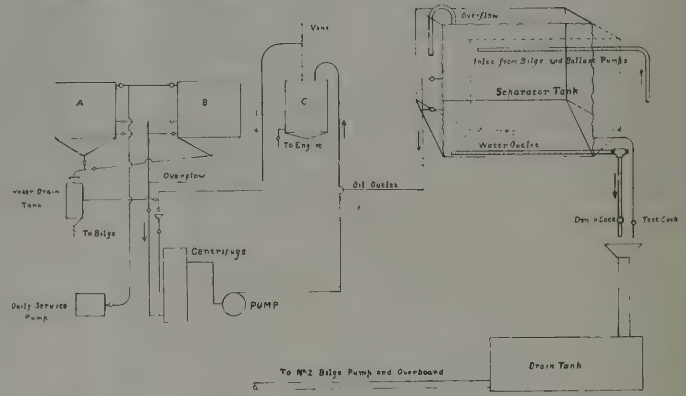


FIG. 2

Fig. 2. Diagrammatic representation of a system of handling service fuel oil on motorships.

NOW that the diesel engine has been brought to its present state of perfection, more attention is being paid to minor details and refinements. In early motorships, the fuel system was far from ideal, and it is the purpose of the present article to discuss a few points and put forward a few suggestions in connection with the handling of fuel oil on board ship.

It is a deplorable fact that, owing to the present state of world commerce, many ships have to travel a good part of the time in ballast, and in most cases this necessitates carrying water ballast in the double bottom fuel tanks. It being impossible to completely drain a double bottom tank, it follows that when a tank is ballasted after having been used for fuel, a certain small amount of oil will be mixed with the water ballast, and this cannot be pumped overboard while the ship is in port. On the other hand, if a tank is filled with fuel after having been used for water ballast, the inevitable small amount of water remaining in the tank can cause the engineer a great deal of trouble unless he is well prepared for it.

Emulsified Fuel.

Trouble may not occur so long as the ship experiences fine weather, but should heavy weather be encountered, emulsification of the water and oil in a slack tank is almost sure to take place. The emulsion may or may not contain sufficient water to cause misfiring in the cylinders; but in any case, a small amount of sulphur, which may be considered quite harmless when there is no water present, can prove very troublesome when the oil is even slightly emulsified. In the writer's experience, exhaust valves which would last in the ordinary course of events for 60,000 miles without being changed, were burnt out after about 600 miles, when trying to run on emulsified oil. The oil in use throughout was a good diesel oil of about 0.88 specific gravity (29 Be), containing about 0.6 per cent of sulphur.

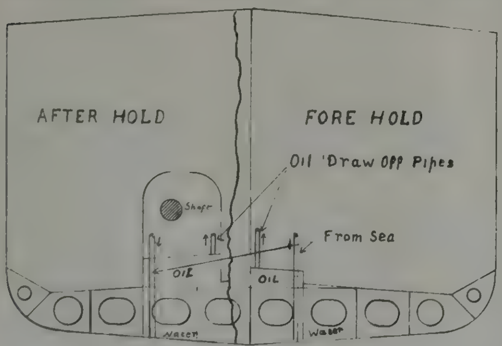


Fig. 1. Diagrammatic sketch illustrating proposed method of forming expansion trunks to take care of double bottom tanks.

Besides affecting the exhaust valves, water in the oil is liable to cause undue wear of cylinder liners and piston rings, on account of its effect on the film of oil on the cylinder walls. From the foregoing it will be seen that the desirability of having the fuel clear of water is a sine qua non.

Settling Tanks.

No diesel fuel system would be workable without some form of settling tank or tanks, but as a rule, if the oil becomes emulsified, it does not have long enough in the settling tank to permit of the water being disposed of.

A peak tank, besides being very useful as a primary settling tank, is very handy when taking oil on board. There can be no reasonable risk of overflowing, if, when bunkering, the oil is pumped direct into the peak tank and gravitated thence to the double bottoms.

In order to deal with the oil that remains in a tank owing to incomplete draining, it is suggested to displace it from the top of the tank by means of the incoming water ballast. Besides saving a large amount of oil, this system would greatly lessen the danger of polluting harbors when pumping out ballast. The problem of providing high points from which to draw off the oil need not present much difficulty.

The tank tops should be given a good camber, and, in the after tanks, the space between the tank top and the floor plates in the tunnels could be easily converted into an expansion trunk, while in the forward tanks, either a small dome or a trunkway could be built on top of each tank at the forward end against the bulkhead. It is assumed that the ship would, in practically every instance, be trimmed by the stern.

Separators.

There are two main classes of separators in use; firstly, those which separate a small quantity of water from a large volume of oil; secondly, those which recover a small percentage of oil from a large amount of bilge or ballast water. Those of the first class work on the centrifugal principle; the second class work more or less by some form of settling. There are several makes of both types of separators on the market.

As far as the writer is aware, the displacement system has not been applied to mercantile vessels. The diagram Fig. 2 outlines the usual system in which the oil is taken from the bottom of the double bottom tanks. A and B are two settling tanks with conical bottoms holding well over a full day's supply of oil. At the bottom of each tank is a drain with a continuous slope down to the water drain tank shown; so that should there be water in the fuel, it will at once gravitate to the lowest point. From the water drain tank, the water is discharged from the bottom, and the oil that is caught is drawn off about the center of the height and led to the centrifuge. The main feed to this centrifuge is from tanks A and B, and the purified oil is pumped up to tank C.

Tank C need not be of more than about six hours' capacity, because the centrifuge is designed to deal with more oil than the engines use; so that, with this apparatus running continuously, there will be a constant small amount of purified oil bypassed back to the centrifuge to be purified over again. From tank C, the oil is fed to the engines.

The settling tanks should not be placed too high above the engine fuel pumps, and the fuel pump discharge valve springs should be sufficiently strong to prevent the oil flooding into the fuel valves on the engine while the latter is stopped and the blast pressure off. If this matter is not attended to, severe ignitions are likely to occur when maneuvering.

It will be noted that the outlets from tanks A and B are fairly well up from the bottom, and high outlets are provided in addition, in case undue quantities of water should be present in the fuel. The small water drain tank is for the purpose of permitting a thorough discharging of the water in the drains from tanks A and B without putting any oily water in the bilges and, at the same time, saving any oil that passes over with the drain water. A bilge and ballast water separator of conventional design is shown incorporated in the system. The mixture of water and oil enters through a perforated pipe at the top. The water is drained out through another perforated pipe at the bottom of the tank and run into a funnel connected to the suction side of a pump which can discharge it overboard. A test cock is shown drawing from a point somewhat above the level of the water outlet pipe; and in operation, when oil shows at the test cock, the water drain is shut or eased down till more water accumulates. In any oil separating device of this description, it is desirable to have the draw-off holes in the outlet pipe as widely distributed as possible. If it is attempted to draw off water too rapidly from a single orifice, short circuiting will take place, and oil will be drawn out along with the water, although the general dividing line between the water and the oil may be well above the level of the orifice.

Sounding Tubes.

In general, all double bottom tanks should have at least two sounding pipes, one forward and one aft. In tanks with a longitudinal bulkhead, additional sounding pipes in the wings would be advantageous, it being inconvenient as a rule to place a sounding pipe in the center of area of the tank. All sounding pipes should have either a series of holes in the internal portion, or should be split; so that when testing with water finder papers, the true contents of the tank may be known. There should be a substantial renewable doubling plate under each sounding pipe.

There should be at least two separate pipe lines to each tank. Test cocks should be placed on each tank suction pipe, on the tank side of the valve, so that the engineer in charge can be sure when pumping out a certain tank that he is not drawing from another tank as well, on account of a valve, which is supposed to be shut, being kept off its seat by some obstruction. In Fig. 4 will be seen an amplification of this idea. Working in conjunction with the test cock is a vacuum breaker valve which is added to make the apparatus fool proof. The vacuum breaker valve permits ingress of air to the pipeline and prevents the escape of oil should the test cock be carelessly left open.

Special care should be taken to insure as thorough drainage of double bottom tanks as possible. There should be efficient passageways between the floors and the outer skin and the tank top respectively, in the first case in order to get the tank as dry as possible, and in the second case in order to facilitate the escape of air when filling.

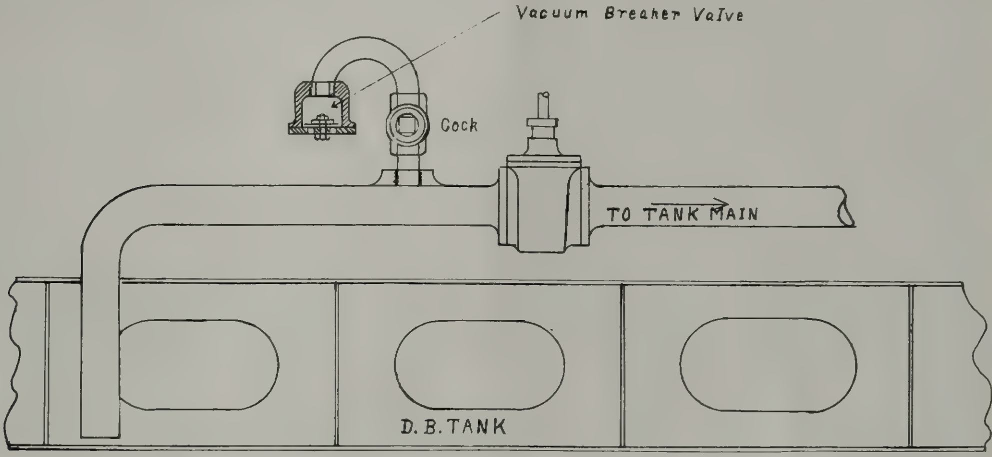


Fig. 4. Diagrammatic representation of proposed fool proof arrangement of double bottom fuel oil tank suction line.

Boiler Fuel in the Solid Injection Engine

By David W. Dickie.

EVERY time a large installation of marine diesel engines is contemplated the question arises, "why not use solid injection?"

The solid injection engine has four main features that commend it for use in place of the air blast engine. First, it is possible to get more horsepower from a given bore, stroke, and revolutions per minute. Second, the governing is better at any given speed. Third, the governing is equally good at all speeds within the range of the engine. Fourth, the use of high pressure air is avoided.

Against this is the disadvantage that, with the engines as at present manufactured, it is not practicable to use ordinary boiler fuel.

The accompanying illustration shows the nozzle tip of a typical solid injection diesel engine magnified to show the principle involved. In the bottom of the nozzle is a little space that has a volume of about seven per cent of the amount of fuel that goes into the cylinder per injection. When the piston on the up stroke compresses the air in the cylinder a small particle of air is forced into the nozzle tip. When the valve is lifted the fuel enters this little chamber at from 3800 to 4000 pounds pressure per square inch and is forced out into the cylinder through the small holes that are from .008 to .012 inch diameter depending on the size of the engine.

Heretofore, the experiments made by the writer to get the solid injection engine to run on boiler fuel have all been based upon the theory that the viscosity of the boiler fuel was the cause of the trouble. This theory was entirely exploded by heating the boiler fuel.

A descriptive specification of the samples of boiler fuel and diesel fuel used in experimental runs is shown in the tables herewith.

	Boiler Fuel Sample No. 1	Boiler Fuel Sample No. 2	Diesel Fuel Sample No. 3
Baume	18.37	19.4	24.
Specific gravity	.9436	.9372	.9091
Pounds per U. S. gallon	7.858	7.804	7.571
Ash 200 mesh, per cent	.024	.008	.037
Asphalt residue by steam distillation, per cent	35.49		3.41
Asphalt insoluable in gasoline, per cent		1.79	
Sulphur, per cent	.65	.367	.45
B T U per pound	18689	18957	18916
B T U per gallon	146858	147939	143213
Viscosity 60 c. c. in seconds 60° Sayboldt	1329	870	122

The viscosity of the sample No. 1 boiler fuel when heated was as follows:

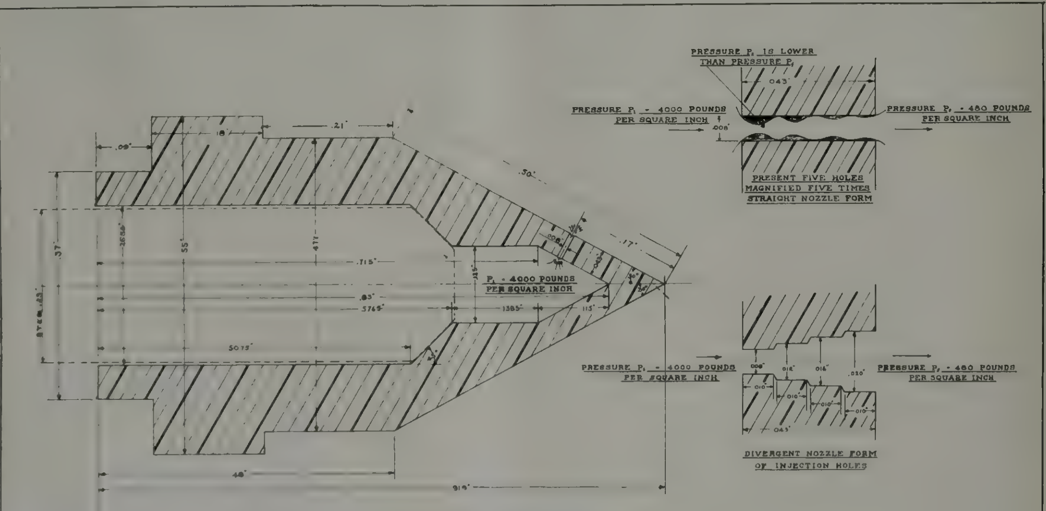
Degrees Fahrenheit	Seconds Sayboldt	Degrees Fahrenheit	Seconds Sayboldt
60	329	110	233
70	880	120	179
80	600	130	140
86	488	135	122
90	428	140	110
100	312		

A peculair circumstance of the tests made with the boiler fuel was that on engines of two different makes using the high pressure solid injection system the shut down from clogged nozzles came in about the same time.

One make ran 39 minutes, 43 seconds.

The other make ran 35 minutes, 55 seconds.

On all tests a hard coke-like substance formed in the small holes of the nozzle tip which was too hard to poke out with the needle that is furnished with the engine and had to be loosened with the drill that is used for boring the small holes.


PRESSURE P_2 IS LOWER THAN PRESSURE P_1
.043"
PRESSURE P_1 - 4000 POUNDS PER SQUARE INCH
.008"
PRESSURE P_2 - 480 POUNDS PER SQUARE INCH
PRESENT FIVE HOLES MAGNIFIED FIVE TIMES STRAIGHT NOZZLE FORM
.09"
.18"
.21"
.50"
.17"
.008"
.043"
.37"
.2658"
.55"
.471"
.715"
.125"
P_1 - 4000 POUNDS PER SQUARE INCH
.83"
.5765"
.1385"
.115"
30°
STEM .83"
.5075"
.48"
.919"
PRESSURE P_1 - 4000 POUNDS PER SQUARE INCH
.008"
.012"
.016"
.020"
.010"
.043"
PRESSURE P_2 - 480 POUNDS PER SQUARE INCH
DIVERGENT NOZZLE FORM OF INJECTION HOLES

THE USE OF BOILER FUEL IN
THE SOLID INJECTION
DIESEL ENGINE

Steam turbine nozzle experimenters threw a great deal of light on the subject of the flow of steam through nozzles and it may be that a clew may be obtained from their work. By using an expanding or diverging nozzle the kinetic energy of the steam is turned into velocity If we assume that air is forced back into the small space in the tip of the nozzle at 450 pounds pressure per square inch which is also heated by the compression to, say, 900 degrees Fahrenheit, and also assume that when the needle valve is lifted the air is momentarily compressed to 4000 pounds per square inch, we will have in the holes of the fuel nozzle tips of the solid injection diesel engine a condition analogous to the turbine nozzle.

The illustration shows a sketch of a nozzle tip drawn to highly magnified scale and a sketch of the holes magnified to a scale five times that of the nozzle tip sketch. These .008-inch holes are drilled under a magnifying glass by means of a jeweler's drill and there is an extremely limited opportunity for "design" if the holes are to be considered in the light of nozzles. However, the fact remains that there is a nozzle .008-inch diameter and .043-inch long, or roughly a length five times the diameter. There is a contraction of the flow of the fuel near the entrance of the nozzle thus formed, and an eddying effect is set up along the remaining part of it.

In the holes of short steam turbine nozzles, whether rounded at the entrance, convergent, or straight, there is a sudden drop of pressure just beyond the throat or entrance to a pressure below that of the discharge chamber. The steam returns to the pressure of the discharge medium in a series of oscillations, roughly proportionate to the depression and decreasing as a damped vibration, until at perhaps one or one and one-half times the length of the nozzle the pressure has settled down to that of the lower medium. It is the function of a well designed divergent nozzle to reduce these oscillations to a minimum.

We are indebted to the experiments of Rosenhain, Stodola, Rateau, and Gutermuth for the data on this subject, and for further information the reader can consult their published works.

Steam being a gas the same as air or fuel oil gas, we may assume that the same action takes place in the .008 of an inch holes of the injection nozzle tip as in the steam nozzle, the difference being that a hard coke-like substance forms in the .008-inch holes which shuts off the fuel and stops the engine.

To get a scouring action throughout practically the whole length of the .008-inch hole for the purpose of stopping the formation of the coke deposits is analogous to the problem of the steam turbine nozzle designers when they invented the divergent nozzle for the purpose of reducing the oscillations of pressure within the nozzle. This is indicated by the fact that the material that clogs the holes appears to gather at the points where the low pressure areas appear in the steam turbine nozzle.

To use the principle of turning the kinetic energy of the flowing medium into velocity it will be necessary to make the outlet in the form of a diverging nozzle; but a tapered reamer for a hole .008-inch diameter is not what might be called a staple article of commerce. However, this might be done in three or four steps by using increasing or decreasing sizes of drills .008, .012, .016, and .020-inch drilling part of the way with each size. This will give a hole for fuel injection that will virtually conform to the divergent nozzle theory. To do this commercially it will be necessary to magnify the feed motion of the drill to such an extent that a distance of .010 inch can be accurately gauged.

On small engines installed locally, the use of boiler fuel is not important; but on large engines going long distances from home the use of boiler fuel may mean the difference between installing steam or diesel.

United States Shipbuilding

(Continued from Page 345)

for its serving in the foreign trade.

f. That this export commodity refund shall be paid to the shipowner, upon proper evidence and certification of the completion of the construction of a ship meeting the requirements as hereinafter outlined.

g. That such export commodity refund shall be in the form of a special issue, as required, of United States Government 25-year bonds bearing interest at the lowest rate of interest of any United States Government bond at time of issue and to be accepted at not less than par.

h. That the foregoing refund shall apply only to such ships as are built according to plans approved by the United States Government.

Typical American seagoing motor freighter.

Oil Engine Combustion Systems

By C. E. Klitgaard.

OF the various problems connected with the design and operation of the oil actuated engine, that of combustion is undoubtedly the most important. As long as it is impossible to build an engine capable of operation with any grade of fuel oil desired without first subjecting the machine to the exhaustive and consequently expensive regulating tests, now necessary, the oil engine cannot be considered entirely successful or satisfactory. There are four phases of combustion to be considered; namely, injection, gasification, ignition, and actual combustion.

Injection.

At present there are three generally recognized methods of injection—

(a) Compressed air injection;

(b) Pressure injection (without air);

(c) Injection by pre-ignition in a retort.

The compressed air system (a) was originally introduced by Dr. Diesel, the inventor of the diesel (oil actuated) motor, and is that generally used by most diesel motor builders, at least for motors of moderately large power.

This system requires a mechanically operated compressor of suitable size capable of delivering the required amount of injection air at a predetermined pressure (usually about 1000 pounds per square inch). By using properly designed three-stage compressors, either with piston or plate valves, the difficulties so general with the earlier type compressors have been entirely eliminated. It might be well to remark, in this connection, that a three-stage compressor consisting of a cylinder having three different diameters in which a piston of three suitable diameters operates, raises the suction or atmospheric pressure to the required ultimate pressure in three stages—atmospheric pressure to low pressure, low pressure to intermediate pressure, and intermediate pressure to high pressure—instead of doing so in one operation as was the case with the first type of compressor. In this manner many of the heat difficulties originally experienced have been almost entirely eliminated.

Motors operated by systems (b) and (c) are the so-called solid injection or compressorless engines, because neither system requires a compressor to supply injection air. It is, of course, possible to utilize air injection without the aid of a compressor, by using the air compressed in the working cylinder itself. Such a system, however, presents so many difficulties due to the temperature of such air, that it is, at least for the present, not practicable.

The airless injection system (b) was originally used chiefly in America and England, by such firms as Worthington, Sun-Doxford, Doxford-Vickers, and others. As it is the simplest form of injection and quite well known, it needs no detailed explanation here. Its merits, particularly for small motors of relatively high speed, have now been recognized by most European diesel engine builders and the system is used by a great many of them.

Injection by means of pre-igniting part of the fuel in a retort, (c), has been almost exclusively developed in Germany, originally by Steinbecker, though a modified system of this type is also used by the Worthington Manufacturing Company on their auxiliary diesel motors. The Steinbecker system has been successfully tested on small motors and motors with moderate cylinder diameters and is now being developed and perfected for use on diesel motors of any size. The method used to insure proper combustion under this system is generally about as follows:

A few drops of fuel—the same amount being used for all loads—are pre-injected into a very narrow channel connecting the working cylinder with a small retort chamber, located in the cylinder cover. This fuel is injected about 3 degrees before piston reaches top center, injection being accomplished by means of an independent stroke of the fuel pump. As the piston approaches top center and the air in the cylinder is compressed, this heated air flows through the above mentioned channel into the retort chamber, carrying this minute quantity of fuel with it. The pressure in the cylinder and in the chamber, due to compression, is about 450 pounds per square inch, having an equivalent temperature of approximately 560 degrees Centigrade and consequently, when the fuel reaches the retort chamber, it is immediately ignited increasing the pressure about 100 per cent, or to about 900 pounds per square inch, the pressure in the working cylinder, due to regular compression, remaining at 450 pounds per square inch. As a natural consequence of this tremendous difference of pressure, the gases generated in the retort are forced through the channel into the working cylinder with great rapidity, carrying with them the main supply of fuel, injected at this moment.

The most important injection problem, with all systems, is to insure the fuel being broken up into the very finest particles possible, although the velocity of the disintegrated fuel is also of vital importance, as efficient combustion depends largely upon the rapid, even, and, as far as possible, complete filling of the combustion space with the disintegrated fuel. Such conditions are naturally best accomplished by use of compressed air injection and are more nearly approached with the Steinbecker than with any other type of so-called solid injection system.

Exhaust gases should be practically invisible up to a mean indicated pressure of about 140 pounds per square inch, after which smoke is visible. At lower pressures, however, smoke indicates improper injection or lack of fresh air.

Under the normal injection air pressure generally used, of from 1000 pounds per square inch to 1200 pounds per square inch, the velocity of the fuel jet is from 750 to 1000 feet per second, which would necessitate a fuel pressure of 4500 pounds per square inch or more if no air were used. By correct adjustment of the fuel injection device, outlined above, it is readily possible to obtain such a fine spray and to spread the resultant mixture of air and oil so evenly throughout the combustion space, that combustion at constant pressure is obtained. Such a result seems hardly possible by the airless injection system (b).

As the volume of fuel under the airless injection compared to the volume of the mixture with air injection system is about as 1 to 25, the control of the small quantities involved in the former system becomes exceedingly difficult, and it is the inability to quite surmount this difficulty which causes motors operated on the airless injection system to show explosive combustion and to generally have excessive sub-firing. In other words, the entire charge does not burn simultaneously and a certain amount of fuel is injected and has to be burned up after actual combustion has taken place. To operate fast running motors with this system of injection without smoke, therefore, requires very careful adjustment and care in handling, and where such motors are used for actuating dynamos it is also extremely difficult to secure the necessary fine speed adjustments under varying loads. This system of injection, (b), requiring fuel pressures of from 6000 pounds per square inch to as high as 15,000 pounds per square inch, makes it imperative that the fuel pumps—to handle such enormous pressures efficiently and constantly—are of special manufacture and exceptionally careful workmanship.

It is particularly interesting to note that whereas every endeavor is being made by diesel builders to eliminate the compressor, such equipment is now being adopted by builders of "hot bulb" motors. The well known Bolinder motor is delivered with attached compressor, the air from which is used for fuel atomization purposes as well as for cooling the upper chambers; the pressure injection (airless) being used only for motors having small cylinder volumes and moderate load fluctuations.

The Steinbecker system (c) was proposed with a view to overcoming not alone the disadvantages of air injection, but also the airless injection system (b). In the Steinbecker system, the high velocity of fuel necessary for proper atomization is obtained by the immense force exerted on the fuel, due to the pressure of expanding gases in a retort chamber; the atomization or gasification is, moreover, greatly assisted by the high temperature of these retort gases, and the detrimental cooling effects encountered by expanding air, as in system (a), is entirely avoided.

With this thought in mind, one of the most prominent motor and shipbuilding firms in Europe, after exhaustive study and tests, entered into a contract with the owners of the Steinbecker patents for the right to utilize this system on their diesel motors, and they have for years been developing this important device with a view to making it suitable for use on units of any power.

Gasification.

Oil vaporization and gasification occur simultaneously during the fuel injection period in all these systems, (a), (b), (c), but the constituencies of these gases before and after ignition have not, as yet, been satisfactorily determined. Among other experts on such matters, Professor Neumann of the Dresden Technical High School has gasified certain diesel fuel oils and determined the constituents of the gas in an electrically heated closed chamber under various pressures. It has not, however, been proved that the fuel oil vapors and gases released in a diesel motor will be the same, and this question remains in doubt. It is at least certain that the reason for the positive difference in results observed in operating diesel motors with various kinds of fuel has not been satisfactorily explained, and a brief discussion of the various fuels, therefore seems in order.

The principal fuels used for the operation of diesel motors are derived from crude oil or from lignite or coal. The oils derived from these sources are—gas-oil and paraffin oil from crude oil, and tar from lignite and coal, this latter being obtained by a new method of low temperature coal distillation. There is also a tar fuel oil used, this being a byproduct produced in the manufacture of illuminating gas and of coke, and is a mixture of the waste distillation products of naphthalene and anthracene. These tars are principally hydro-carbons of aromatic base, while the fuels derived from crude oil are of aliphatic base.

The gasification curves of these two kinds of oils are very distinct from one another; that is, according to Professor Neumann's tests, paraffin oil is completely gasified at 480 degrees Centigrade, whereas to obtain a similar result with tar oil 560 degrees Centigrade is necessary. It is interesting to note that although paraffin oil is completely gasified at 480 degrees Centigrade, not even 5 per cent of the tar oil is gasified at this temperature. The difficulties experienced in operating an "explosion" motor with tar oil are therefore obvious.

Ignition.

According to generally accepted opinions today, vaporization of fuel precedes ignition and, until comparatively recently, it was believed that the temperature at which ignition of various fuels occured in diesel motors could be determined by the usual ignition tests. Hohn, as well as Constain and Schlaffer, and no doubt others, have conducted such tests, Krupps endeavoring to check the results in their laboratory at Essen.

Ignition tests in a platinum crucible, conducted by Constain and Schlaffer, showed the following ignition temperatures:—

	Ignition Temperature
Gas oil	440 — 480° C.
Paraffin oil	440 — 480
Tar oil	590 — 630
Anthracene oil	650

Compare with these results the ignition temperatures of the gases, hydrogen, methane, and carbon-monoxide, as determined by Neumann in his tests gasification of diesel fuel oils:—

	Ignition Temperature
Hydrogen	580 — 670° C.
Methane	660 — 750
Ethane	580 — 620
Carbon-monoxide	544 — 658

As will be noted, the ignition temperatures of the gases contained in the fuel oil, as reported by Professor Neumann, are higher than the ignition temperatures of the fuel itself, as reported by Constain and Schlaffer. We must, therefore, assume that conditions governing the gasification of fuel in a diesel motor are different than the conditions under which the above temperatures were determined. It has been found, however, that the ignition temperatures in the motor, under normal operating conditions, agree more nearly with the results obtained by the latter experts than those obtained by Professor Neumann.

Now compare the temperatures reported above with the compression temperatures probably obtained in a diesel motor, under different pressures and full load:

Final compression pressure lbs. per sq. in.	150	225	300	375	450	525	600	625	750
Corresponding temperature °C	340	410	470	515	560	595	625	655	680

It is evident that with gas oil a compression pressure of about 300 pounds per square inch is sufficient, whereas, with tar oil a pressure of from 500 pounds per square inch to 600 pounds per square inch is required. In actual practice, of course, these pressures would have to be somewhat increased, due to the cooling effect of the injection air. Therefore, if it is intended to operate a motor with tar oil and reasonably low compression, it will obviously be necessary to resort to some artificial ignition method, such as the use of hot bulb or electric spark.

Combustion.

Satisfactory combustion of fuel after ignition starts not only depends on the efficiency of atomization or, in other words, upon how fine the fuel spray is, but perhaps more upon the uniform distribution of the gases in the combustion space and also upon careful design of the cylinder, allowing a swirling motion of these gases to take place. To accomplish this, a special design of fuel nozzle and atomizer plate is used through which the fuel is pumped at high velocity, as mentioned before.

The great secret of proper combustion (smokeless operation), however, is to be found in correct timing of the fuel injection through this special nozzle and atomizer. Obviously, a very difficult problem presents itself in designing the correct apparatus for pumping this high velocity fuel through the nozzle in a few hundredth part of a second. It is therefore not surprising that in most of the tests conducted by diesel motor manufacturers with solid injection systems, discouragement was the order of the day and hundreds of fuel injection nozzles of different shapes were developed and tested in an endeavor to secure satisfactory results.

With one exception, most of the manufacturers of diesel motors have given up what appeared to be an unattainable ideal and have contented themselves by developing the less efficient airless injection system (b); this, notwithstanding that upon the satisfactory development of a Steinbecker or similar system apparently depends the solving of the solid injection or compressorless problem, at least for diesel motors of the larger sizes.

The elimination of post ignition, that is, the burning of fuel introduced into the cylinder during expansion, depends upon correct timing, proper design of fuel pumps, and principally upon the velocity of combustion, and this in trun upon the proper swirling of the mixture injected into the cylinder.

Numerous tests of gas engines have quite thoroughly established the fact that the circular motion produced by inrushing air considerably facilitates and speeds up ignition. Such circular motion is naturally greatly accentuated in an air injection diesel motor, which accounts for the more efficient combustion secured with this type as compared to motors having airless injection.

Diesel Progress

(Continued from Page 353)

about 60 per cent power in reverse. It has a transmission efficiency of about 96 per cent.

In Great Britain the tendency toward double-acting diesel engines is even more marked than on the Continent. There double-acting units are being installed in several fast single-screw freighters for Far Eastern routes. The superior over-all economy of higher speed freighters with their higher annual earning power is a happy result of this arrangement. Nearly every large British ship operating firm is financially interested in one or more ship building and engine building plants and seems willing to experiment with promising new types of diesel engines. In America the progress of the Shipping Board program of conversion will give an opportunity to study the comparative merits of two and four cycle single and double acting engines. Before the end of the year several of these jobs should be in service, and by the spring of 1927 we should have quite a demonstration fleet of motorships.

The European marine engineer has not taken as readily to the diesel-electric drive as has the American. There are some services where this drive is ideal and of course others where it is not a practicable proposition. It is making a strong bid for favor as a drive for short trip ferries and for harbor craft of many types, particularly shallow draft tankers. This is especially true on the Pacific Coast where such firms as the Standard Oil Company (Calif.) Southern Pacific Company, and the Golden Gate Ferry Company have adopted this drive for their San Francisco Bay craft. Diesel-electric is coming into favor both on the Pacific and the Atlantic Coasts for dredges, for seagoing tugs, and for small special coasters. A few very interesting installations have been made recently on Great Lakes vessels. We venture to predict that before long this type of drive will find favor with the Pacific Coast lumber carrier.

Taken as a whole, the marine diesel engine situation seems to be quite hopeful. Motorship registration is gaining rapidly on that of steamers. Every new ship projected is an active diesel engine prospect. The Shipping Board fleet is gradually being sold out or scrapped. Motorships are in active service accumulating records of performance which make unanswerable arguments for the diesel. The most conservative shipowners in the world have been almost completely won over.

If the marine diesel engineer, the diesel manufacturer, and the shipbuilder can now get together to produce a standard marine diesel installation which could be built on a manufacturing basis for volume production, so that diesel installation costs will approximate steam installation costs, then we will soon see all of the world's oil burning merchant fleets dieselized.

Malaya Comes Up

To the school boy who has been at a loss to understand why his reluctant attention should have been directed to faroff Malaya it probably will be illuminating to know that for the first time that region stands at the head of the list of American sources of supply.

"The sensational rise in the price of crude rubber during the latter part of 1925," says the Foreign Commerce Department of the Chamber of Commerce of the United States in its analysis of world trade, "placed British Malaya at the top of our sources of supply for the first time in history, the value of our imports from the Malay Peninsula in the first quarter of 1926 being $85,422,000, or 140 per cent, larger than a year ago. Imports from other Far-Eastern rubber producers, the Dutch East Indies and Ceylon, also advanced sharply, the former increasing $20,944,000, or 95 per cent, and the latter $10,708,000, or 130 per cent."

Pacific Workboats and Their Power Plants

Boat Yards at Tacoma

THE Port of Tacoma, Washington, has lately completed and has in operation one of the largest electric power plants in the West. As current from this project is sold at less than 2 cents per kilowatt to large consumers, it will no doubt in the near future increase manufacturing as regards small shipyards. At present this industry is not so brisk.

However, there are several firms in Tacoma engaged in building small craft, among them the **Western Boat Building Co.** At this yard there is now under construction a freight workboat 115 feet length, 32 feet beam, and 10 feet 6-inches depth. She is designed to carry big cargoes on very light draft, and while barge-like in appearance has a good entrance forward, and fairly easy lines aft. She will be powered by a Fairbanks-Morse full diesel engine of 180 horsepower. A superstructure over the main deck gives shelter for freight carried there and also provides quarters for the crew. She is being built to the order of the Merchant's Transportation Company of Tacoma and will be used to handle their growing business. A duplicate, or somewhat larger craft on similar lines, may be started soon.

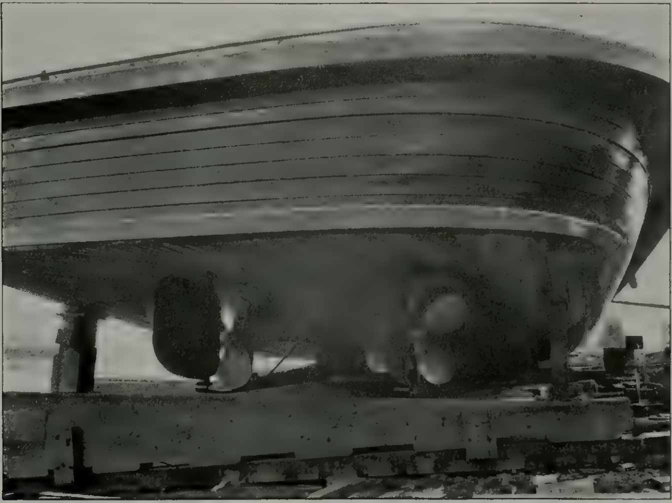
The Western yard is well equipped for the class of business to which it caters. A machine and blacksmith shop on modern lines handles the metal work. Woodworking tools in plenty in a large shop near the building ways take care of joiner and ship carpentry work. At one side of the shops are two hauling out ways, which can handle vessels up to 150 feet in length. The firm has lately completed a 68-foot seine-boat for the sea fishing fleet.

Babcock & Thearle Slip No. 3, Port of Tacoma, is an able organization. P. H. Thearle, N. A., is general manager and designer, while H. D. Babcock is shop executive. This company specializes on new work, paying very little attention to repairs. In event of small craft needing some hull work of a nominal nature, a gridiron takes the place of ways. Both the young men are Pacific Coast products. Mr. Thearle was with the Union Plant at San Francisco during the late war, and Mr. Babcock was with Seattle shipyards.

This yard recently completed the tug Edward A. Young for the Capitol City Tug Company of Olympia, Washington. The craft is 65 feet long, 16 feet beam, and 7 feet draft. She is powered with a direct reversible Fairbanks-Morse diesel of 120 horsepower. Since being in commission she has been steadily employed, and the owners believe her one of the best tugs of her class on Puget Sound.

Babcock & Thearle also built the boom boat Peterman No. 1. While this type of vessel are known as "boom boats" in logging waters, they are workboats nevertheless, for their business is to handle the immense logs from the big rafts as they are floated into the mill districts. Such work requires sturdiness and power. The Peterman No. 1 is 35 feet long, powered with a Cummins full diesel engine of 35 horsepower. Her performance has been very satisfactory since going into service.

Babcock & Thearle have just completed for H. R. Kilworth of Tacoma the yacht Junar, equipped with a Hall-Scott reduction gear gas engine of 90 horsepower. A feature of the Junar is that all interior bulkheads and ceilings are of Plywood a product of the Tacoma Veneer Co. This material is made up of thin sheets of veneer and in different thicknesses up to three-quarters of an inch. It makes a beautiful interior finish, as there are no beads or visible joints in the work.



ATLAS CONVERTS STERN WHEELER.

Our illustration shows a close-up of the reconstructed stern of the Columbia River towboat Shaver. This vessel, formerly a stern wheeler, has been converted to a twin-screw, diesel-driven, shallow draft tug with tunnel stern. Each of the two screws shown in the illustration will be driven by a 375-horsepower Atlas-Imperial full diesel engine. These engines are now being installed at Portland, and it is expected that the craft will be ready for trials the middle of August.

The conversion of this towboat is a new departure on the Columbia and its trials will be anticipated with considerable interest by marine engineers. The Shaver Transportation Company operates a large fleet of river towboats. On the completion of the trials of the Shaver, Pacific Marine Review will publish an article giving full details.

Mojean & Ericson of Tacoma, are also a new firm, having been about one year engaged in workboat and yacht building. While they have no new work in the yard at this time, O. Ericson, manager, reports prospects as good and several jobs in sight. They have recently finished a 57-foot cruiser for Dr. Blair of Tacoma, named Leota. She is powered with a Lewin-Knight gas engine. The finished vessel shows splendid workmanship and careful design. The firm have also built recently a seine-boat for the Sound Fishing Company. This vessel is 66 feet long, 16 feet beam, with draft of 7 feet, and is engined by a 60-horsepower Fairbanks-Morse diesel. She is very staunchly built for strenuous sea trips in heavy weather.

San Francisco Bay Yards

In spite of the usual summer slackness in work the **Anderson & Cristofani's yard** at Hunter's Point San Francisco, is quite busy. Two 50-foot sardine barges have just been delivered to the Monterey canneries, and two more are on order. Besides this two 35-foot fishing craft are under construction for southern firms. These latter are from design by A. W. Lawson of San Francisco, and will be engined by 20-horsepower gas units.

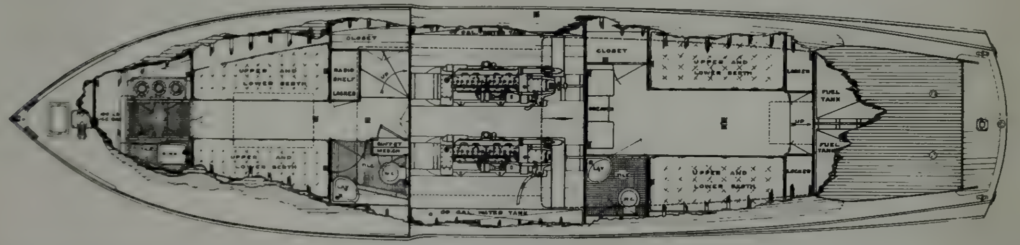
Captain James Woodworth has been appointed master of the new H. O. Harrison yacht K'thanga, just launched from the yard of **John Twigg & Son**, San Francisco. Captain Woodworth is an old time sailing ship man and during the late war was also in command of Shipping Board steamers. Born and brought up on the East Coast, he has the real salt water training and will keep the new yacht up to the highest degree, well found and ship shape. Pacific Marine Review will later publish a description of the craft, one of the finest so far built on San Francisco Bay, creditable alike to the builders and to the owner, who believed rightly that made in San Francisco was a guarantee of excellence.

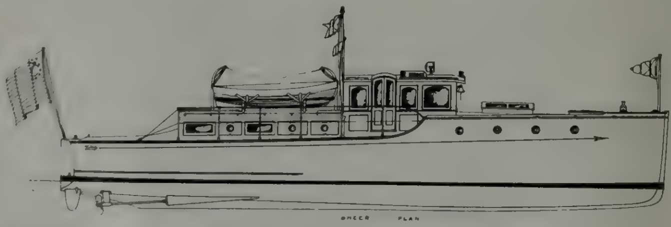
The **J. H. Madden yard** at Sausalito has been rushed during the past few weeks getting yachts and other craft ready for operation. Six vessels were on the ways recently being painted and overhauled. Among them was the twin screw cruiser Hopestill, owned by Carl A. Henry. This craft is being completely renovated and will go into commission practically new. Among the recent construction jobs at the Madden yard is the Class R. sloop yacht, the Ace. This craft has at her trials developed a speed which is considered phenomenal among the 43-footers. Her owner, Arthur F. Rousseau, is well pleased by this latest addition to his fleet. In addition to the yacht repairs, several workboats have been hauled out for minor jobs and painting. All this makes for a busy place.

The **Sausalito Boat Yards,** M. Pasquinucci, manager, keeps occupied with fishing boat repairs and also has three new open deck aft type craft building. These will be fitted with 6-horsepower gas engines and used in the local trade.

The **C. L. Arques** yard at Sausalito, which specializes in barge building and repairing, has lately had several of the Rhodes-Jamieson large rock barges on the ways for overhauling. One new barge for stock is also under way.

V. D. Fry, for many years associated with the Atlas-Imperial Engine Company, has gone into





WELL DESIGNED STANDARD CRUISER.

Our three illustrations show the standard 47-footer which is one of the specialties of the Fellows & Stewart yard at Wilmington, California. These boats are regularly equipped with a pair of 6-cylinder Kermath motors developing 65 brake horsepower each at 1200 revolutions a minute.

The "Fellows-Craft 47" is very nicely modeled and, as will be seen from the illustration, makes very little disturbance of the water. The first of these boats on a displacement of 2100 pounds made better than 13 knots on spurts at 1200 revolutions a minute.

Snapped by Pacific Marine Review staff photographer at the Fulton yard, Antioch, California, this group shows F. L. Fulton and V. D. Fry of Antioch and Messrs, Lorimer and Larkin of the Atlas-Imperial Engine Company.

business for himself at Antioch, California. He has established a shop for general repairs of machinery, specializing on workboat engines. His thorough knowledge of diesel engines will ensure good results when that type of motor is handled by his force of employees. Mr. Fry's shop is close to the yard of **F. L. Fulton**, at Antioch. Arrangements have been made whereby the hauling out ways and outfitting wharves of the ship yard can be used by Mr. Fry, thus enabling workboat owners to attend to hull and engine repairs simultaneously.

The **American Dredging Company** handle a number of workboats in their business and are also closely associated with the **Harbor Tug and Barge Company**. To have the building, repairing, and general up-keep of the fleet attended to in a thorough manner, W. S. Brusstar is employed as master shipbuilder. Mr. Brusstar is well known on the Coast, having for several years operated a yard on the Oakland Estuary. Here he designed and built quite a number of tugs, yachts, and barges. These were well built and have stood up under severe conditions. During the late war Mr. Brusstar and his son, Delano, operated a yard at Morse Point, Mississippi, where fifteen wooden hulls of the Ferris type were turned out. Most of these are still in active service. One of them, the Nikka, was burned at sea some months ago. All were said to be of a much better construction than ordinary, showing careful and competent workmanship on the part of the Brusstars.

W. S. Brusstar, master shipbuilder for the American Dredging Company, San Francisco.

W. S. Brusstar is a native of Baltimore, Maryland, and learned naval architecture and practical shipbuilding in the yards where many famous ships were built. Three sons are also shipbuilders, two being in Oakland yards and one in the east. The American Dredging Company believe that a man of Mr. Brusstar's ability is an asset to the business. Extensive repairs are always going on, as the work of dredging is wearing on hulls and gear. Quite a force of men are employed at the company's Oakland yard at this work. It may be mentioned that the workboat Harbor was built at this yard by Mr. Brusstar. She is without doubt one of the best of her class.

Among the many hulls built by Brusstar was the yacht Lagonia, owned by W. B. Hearst of Baltimore. This vessel was remarkable for her speed, though designed more for a cruiser. Several sea island traders, some sail, others with auxiliary power, have been constructed under Mr. Brusstar's supervision, and satisfaction has always been a feature. Particularly noted was the schooner Kate Darlington, which made some phenomenal runs when in the Atlantic trade.

Diesel Tug Lion

TWO years ago the Cornell Steamboat Company, after severe tests, purchased the tugboat Jumbo, a 600-horsepower, 100-feet craft with 26 feet beam and 12 feet draft and Nelseco engines, and have been using this boat on their heavy Hudson River tows. The tremendous savings and other features of this tug soon convinced them of the superiority of diesel over steam propulsion and within the last two years they have consequently added two more Nelseco diesel engined tugs to their fleet, namely Cornell and Eli B. Conine. The Cornell and Conine are equipped with Nelseco engines of 300-brake horsepower each and are connected to the propeller through a reduction and reversing gear.

This company recently purchased the tug Lion from the New London Ship & Engine Company, this boat being a duplicate of the Jumbo and equipped with 600-horsepower, 6-cylinder engine.

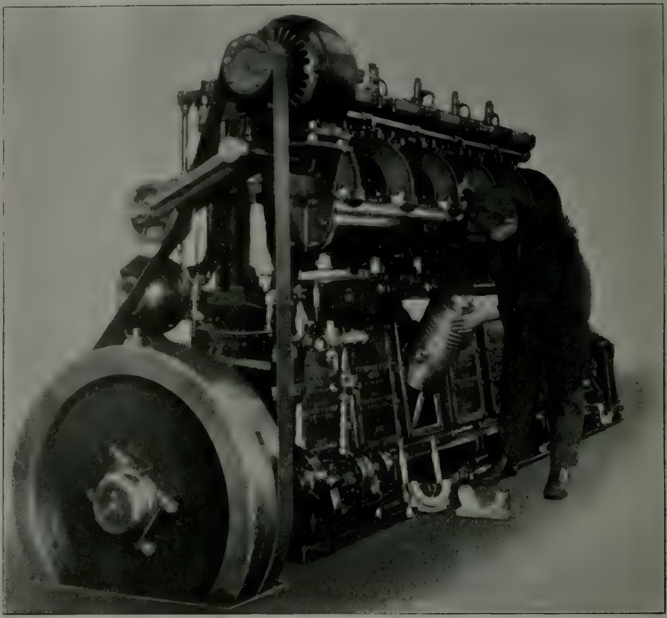
The steady accumulation of diesel tugs by the Cornell Steamboat Company, which is the largest towboat concern in New York and on the Hudson, should be of great significance to tugboat operators as yet unfamiliar with this modern, economic prime mover. The superiority of the diesel tug as compared with the coal burning steam tug is shown not only in a much lower fuel expense, but also in fewer men required to operate the boat, in the elimination of frequent calls at the coal dock, greater cleanliness, elimination of taking on boiler feed water, and, furthermore, in the fact that the diesel engine will deliver its full rated horsepower for indefinite periods, while the steam engine is handicapped in this respect due to almost unavoidable fluctuations in boiler pressure.

Washington-Estep Power for Admiral's Flagship

UNDER the able management of A. C. Estep, designer of the Washington-Estep full diesel engine, the diesel engine department of the Washington Iron Works, Seattle, is rapidly expanding new markets for its excellent product. Mr. Estep recently, on a trip to the Atlantic Coast, arranged for an agency in New York with branches in Boston, Philadelphia, and Baltimore. This agency is the Sexton Motor Company, headed by Frank Sexton, formerly well-known on the Pacific Coast, where he was connected with the Corliss and the Frisco Standard Engine companies.

One of the recent orders from the Sexton Motor Company includes a 270-horsepower full diesel for installation in the tug Erin of the Shamrock Towing Company of New York.

Our illustrations accompanying this article show the ocean-going power cruiser Sueja III, designed by L. E. Geary, naval architect of Seattle, and built in the Winslow yard at Eagle Harbor for Captain



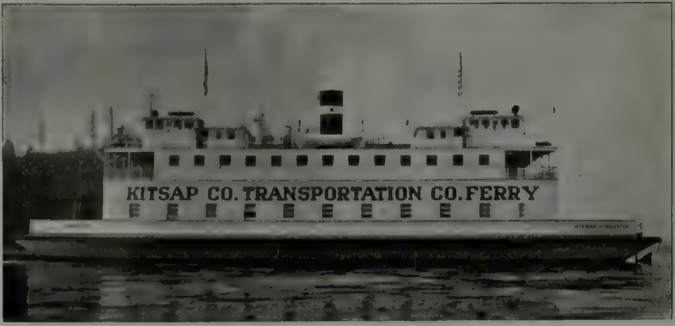
POWER FOR A FLAGSHIP.

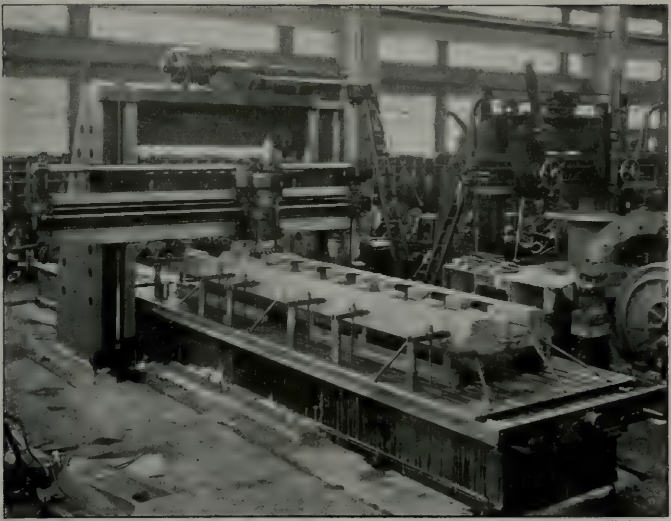
Above is shown the 6-cylinder, 180-brake horsepower Washington-Estep full diesel engine, a pair of which are installed in the engine room of the Sueja III, flagship of Captain James Griffiths, Admiral of the Pacific Coast Yachting Association.

Note the electric generator mounted on bracket and driven by a belt from the fly wheel. This is a special equipment suggested by the designer of the yacht to save space in the engine room. Note also ease with which piston can be removed from the engine.

SERVICEABLE DIESEL FERRYBOAT.

At the right is shown a broadside view of the Kitsap of Seattle. This double-end screw ferryboat has been operating on a practically continuous schedule for many months, she is powered with a 6-cylinder, 17 by 24-inch, Washington-Estep full diesel engine. During the whole of her service she has never once been forced to stop from engine trouble, the engines delivering full power continuously with practically no expense for maintenance or repair.





New Ingersoll planer type milling machine in the machine shop of the diesel department of the Washington Iron Works, Seattle, working on a bedplate for a Washington-Estep full diesel engine. This machine weighs in excess of 85 tons and is the largest of its type on the Pacific Coast.

James Griffiths of Seattle. The Sueja III is the third pleasure craft of this name built on Puget Sound for Captain Griffiths. She is 117 feet long over-all, 19 feet beam, and 8.6 feet draft. There are ample accommodations for ten persons in addition to the crew.

The power plant of the Sueja III consists of two 180-horsepower Washington-Estep full diesel engines, which drive the yacht at a sea speed of 12 knots an hour. The fuel tanks installed have sufficient capacity to give a cruising radius of 4500 miles at this speed. On the trial trip a speed of 12½ knots was obtained with the engines turning over at 10 revolutions a minute less than the rated maximum. These engines are 6-cylinder units of 9½-inch bore and 12½-inch stroke. As will be noted in the illustration, the engines have an electric generator mounted on a bracket on the forward end and driven by a belt from the fly wheel. These two generators furnish ample light and auxiliary power for Allan Cunningham anchor windlass and boat hoists, for driving tools, for numerous electrical appliances in the pantry and galley, and for pumps.

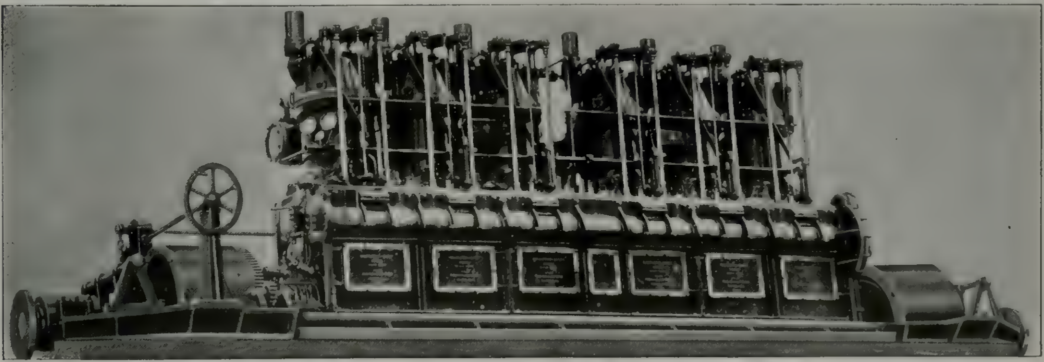
The hull of the Sueja is built of Oriental hardwoods, the frames and planking below the water line being of Yacal, the topsides planking, decks, and all joiner work being of teak.

Captain James Griffiths, the owner of this yacht, is admiral of the Pacific Coast Yachting Association, and the Sueja III will fly the Admiral's flag at all of the yachting regattas on the Pacific Coast this year.

The Sueja III will be in San Francisco Bay about the middle of August and will remain through the regatta which is to be held from August 21 to August 28. W. H. Worden & Company of San Francisco, California distributors for the Washington-Estep diesel engine, will at that time be pleased to make arrangements to show interested engineers and naval architects the power installation on this latest Pacific Coast ocean going cruiser.

Washington-Estep engines are making a great record for themselves as a dependable power unit. The 600-horsepower, 6-cylinder Washington-Estep diesel engine illustrated herewith has been operating in the ferryboat Kitsap of Kitsap County Transportation Company continuously for many months. The Kitsap is a vessel of 528 gross tons; she is 169 feet long and 52 feet beam; she maintains a speed of 10 knots an hour. She is a double screw, double-ended ferryboat with clutches and gear at each end of the engine. The engine is of 17 inches diameter and 24 inch stroke. It has functioned perfectly since installation with practically no expense for repairs or renewals.

The Washington Iron Works are justly proud of their equipment in the diesel department. Amongst other tools they have recently installed an Ingersoll planer type milling machine to insure maximum perfection in the machining of engine bedplates. This machine is said to be one of the two or three largest of its type in America and the largest of its type ever shipped to the Pacific Coast.



The 6-cylinder Washington-Estep full diesel engine for the double-end screw ferry Kitsap.

Auxiliaries—Ship Supplies—Marine Equipment

Cutting Costs at Terminals, I

By Harold J. Payne

Of the Staff of the Society for Electrical Development.

ECONOMICAL operation of marine terminals depends largely upon the elimination of misapplied man power. Realization of this fact has led to the development of highly efficient equipment and methods that are being applied with conspicuous success by several concerns operating in various ports throughout the United States. In the vicinity of New York, where labor costs are high and the pressure for speed is incessant, remarkable decreases have been brought about in the cost of essential handling operations through scientific application of power equipment. In achieving these cuts the electric industrial truck and tractor have played a large and important part. At least forty-five concerns each operating one or more piers on the New York waterfront, are now making profitable use of this equipment.

Working over a distance of 500 feet, including 70 feet of 11 per cent grade, this truck does the work of ten men and saves $50 a day.

Holland-America Line Practice.

Four years ago the dock superintendent, A. Roggeveen, decided that it was becoming imperative to devise a new means for grappling with the constantly rising cost of handling. The electric industrial truck appeared a remotely possible solution of the problem—remote because of the extreme congestion that existed on the pier at that time. Then too it was felt that the introduction of power trucks might antagonize the stevedores with serious consequences in the way of highly expensive tie-ups. Furthermore, there was the consideration of financial outlay involved. Certainly there was no point, it was held, in spending more to cut the cost of handling than the cut itself could possibly justify.

Three men to move two cases.

Extensive study of the problem led, however, to the decision to purchase a single machine of the straight platform type and to base further use of power trucks upon the performance of this one. Contrary to expectations, this truck proved to be flexible enough to work in and out of tight corners, going wherever the hand trucks could go, carrying four to five times the hand truck load at from six to twelve times its speed. Nor was any difficulty encountered with the men. The management became convinced that at least 6 trucks could be used to advantage; then within a year a jump was made to a total of 20 units, all of the same type. In the meantime records of cost and of savings effected were carefully kept.

Formerly it was the custom to use 16 men to work two bulkheads. Now, instead, 5 trucks with drivers, but with no helpers, do the same work. The average daily figure for the operation of each truck is $2.68, including all items. At present about 12,000 tons of freight is being handled each week over the pier which the power trucks are working; although in case of heavier traffic as much as 20,000 tons can be handled. The trucks are frequently in service for 13 hours a day, being given a boost during the noon hour to insure satisfactory performance.

A regular and thorough inspection is provided for all of the trucks, the batteries are carefully watched and their charging is regulated with precision. As a result, mechanical difficulties are practically unknown and all of the equipment is in first class condition all of the time. The cost already cited covers the entire expense of this regular overhaul, indicating that when the best of attention is paid to the trucks the net daily charge against them averages barely half the wages of a single stevedore.

Odd Uses Discovered.

As is usually the case where power trucks of this kind are installed, many uses have been discovered since their purchase that were not thought of previous to that time. Recently, for instance, a large number of automobiles in crates have been handled. Formerly 10 to 15 men working hard were required to transfer such a crate a couple of hundred feet and the job was both laborious and slow, sometimes requiring twenty minutes or half an hour. Now such an operation requires only a few minutes' time of one man and no physical effort on his part whatever. This allows the same speed to be maintained late in the day as the start—a distinct advantage impossible of realization when the work is done entirely with man power unassisted by mechanical means. For special jobs of hoisting, block and tackle are sometimes rigged above the pier. Instead of putting a gang of men on the rope to do the work the trucks are now used, doing odd lifting jobs in this way.

One man and truck moving twelve cases.

Fire Protection for Bulk Oil Tankers

By A. M. DOXSEY

A FEW years ago, when some of the large oil companies were studying the question of diesel propulsion, the problem of fire protection was found to be without a satisfactory solution.

At the instigation of some of the oil companies, who were studying diesel drive for new construction, investigations were started to find a satisfactory substitute for steam in providing fire protection in the cargo oil tanks and at the same time meet the regulations of the United States Steamboat Inspection Service. The use of some inert gas seemed to be the logical solution providing it could be easily carried, would be commercially available, and could be satisfactorily applied.

Of the inert gases available, carbon dioxide seemed to be the most capable of meeting the requirements. Carbon dioxide is a well-known commercial product, chemically known as CO_2 and ordinarily known as the fizz of soda water. It is stored in steel cylinders and can be obtained in almost all principal cities and ports.

Up to a few years ago the use of pure carbon dioxide as a fire extinguishing agent was limited by its tendency to freeze when released from its steel storage cylinders. When liquified carbon dioxide passes from its storage cylinder to the atmosphere the liquid boils and expands to gas, thus absorbing the latent heat of vaporization from the accompanying liquid, which soon solidifies. As a result the discharge from commercial cylinders will cause the valve passages to stop and at least one-third of the contents will become solidified and thereby rendered useless until thawed out. The thawing operation is difficult, burdensome, and lengthy.

The third requirement, namely satisfactory application, has been solved by the method of release, known as the Lux system. This system entirely eliminates the uncertainty of discharge and permits the entire contents of the cylinders to be immediately available. The result is accomplished by not permitting the liquid carbon dioxide to boil until it is discharged into the atmosphere.

The Lux system of releasing carbon dioxide has been used for some years for providing a smothering gas for extinguishing fires in closed spaces.

When the problem of providing efficient protection for cargo oil tanks was studied, it was found that not only the release of carbon dioxide in liquid form was essential, but that large quantities had to be released at one time. This obstacle was overcome by the development of a special type of quick release cutter valve, which enabled the release of any number of cylinders of carbon dioxide at one time. It also enabled the use of remote control which proved to be so desirable on board tankers.

The Lux application to cargo oil tank protection was thought to be feasible as the gas could be brought over the surface of burning oil in large volume and at high velocity.

Fires in cargo oil and fuel tanks usually occur when the hatch covers over the expansion trunks are open. By the use of carbon dioxide it was found that only the expansion trunk openings need be protected. Extensive tests were conducted on a full-size expansion trunk.

It was finally found that the projecting of blankets of carbon dioxide gas across the opening cut off the oxygen supply completely, thereby causing the entire extinction of the fire in a few seconds, the time depending upon the volume of air space between the blankets of gas and the burning oil level. Moving pictures proved to be a valuable asset in studying the action of the carbon dioxide in extinguishing these fires.

The carbon dioxide gas blankets are provided by Lux special nozzle pipes and opposed nozzle assemblies.

There are many other spaces on tankers that are serious fire risks. Pump rooms, engine rooms, cofferdams, oil rooms, donkey boiler rooms, and filter rooms are danger spots. Gas can readily accumulate, and the slightest spark will cause an explosion. On steam tankers no efficient protection has been provided.

The Lux system has been developed and found to be very efficient for extinguishing fires in semi-open spaces, resulting from explosions. Fires at any level in the space, even flowing oil, are readily extinguished in a few seconds by the Lux total flooding application. This application of filling the entire space with gas has been demonstrated many times on a large scale, and has proved its efficiency under actual service conditions.

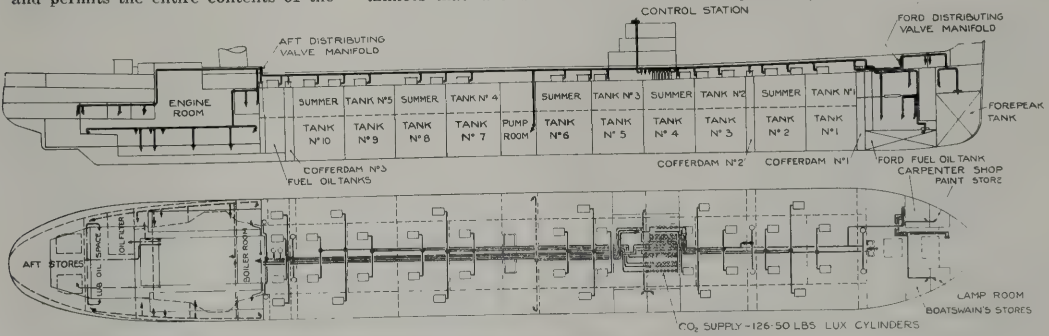
With Lux protection for the tanks the same carbon dioxide supply is available for protecting all other danger spots.

For steam tankers the Lux system can be wisely applied for protecting the oil fired boiler rooms and pump rooms. Lux protection for oil fired boiler rooms has been exhaustively demonstrated and has been found to be the logical extinguisher for flowing oil at any level.

As certain subsidiary companies of the Standard Oil Company (N.J.) have just completed an extensive building program in Germany, it may be of interest to give a general description of the Lux system installed on all their new 12,000-ton tankers.

The specifications required a Lux installation for protecting all the cargo oil tanks, fuel tanks, day tanks, cofferdams, boiler room, pump rooms, motor room, oil filter room, lubricating oil room, and other compartments as required to meet the regulations of the United States Steamboat Inspection Service, American Bureau of Shipping, and Germanischer Lloyds.

The general arrangement of the piping is given on the accompanying plan. The cylinders are located in 10 batteries of 12 cylinders each, and 1 battery of 6 cylinders.



Diagrammatic inboard profile and deck plan of 12,000-ton tanker showing arrangement and location of Lux cylinder batteries and piping for complete fire protection of cargo and machinery spaces.

Three illustrations showing an experiment in extinguishing an oil fire by CO2. After fire had been been burning 8 minutes in a high wind, it was extinguished in less than 5 seconds by the application of Lux carbon dioxide.

Each battery of 12 cylinders is directly connected to a group of 4 tanks. The small battery of 6 cylinders is connected direct to the common manifold. All cylinder batteries are interconnected by a common manifold. The engine room, pump room, and other spaces protected are provided with leads through distributing valves from the common supply.

There are 126 50-pound Lux cylinders total, located in a caged space in the shelter deck space below the bridge. The cylinders are supported on structural iron brackets clear of the deck and are held in position by solid oak racks. The cylinders are connected to the manifolds by annealed copper connectors with swivel couplings. All cylinders are therefore easily removable for inspection or recharging.

The control release handles are on the flying bridge where they will always be accessible in case of emergency.

In case of a fire in any one or more of the cargo oil tanks or fuel tanks, it is only necessary to pull the proper control handle in order to extinguish the fire. With fires of this sort a minimum number of operations and shortest possible time are essential to efficient extinction. For extinguishing fire in any of the other spaces it is only necessary to shut off the tank manifold control valves located at the ends of the cylinder manifolds, open the proper distributing valve, and release the required batteries of cylinders as required in the instructions. Full instructions and charts are provided with each installation.

A National Water-Tube Boiler Expert

Born at San Rafael, California, in 1879, V. W. Hoxie like most American lads attended the public schools. He also studied at the Stevens Preparatory School and later took a special course in Engineering at University of California. In 1898 he became associated with the Chas. C. Moore Co., Pacific Coast representative of the Babcock & Wilcox Corporation. He is now the chief of the marine department of all the Pacific Coast business for the firm. During these years of service Mr. Hoxie has aided materially in the development of steam generators, his practical knowledge being supplemented by a thorough technical training. During Mr. Hoxie's service he has supervised the installations of many hundreds of boilers. A great many of these were on naval vessels, and among the engineers of the United States Navy he is looked upon as an authority on water-tube boilers and fuel oil burning. The more modern methods of steam generation have been closely followed and in many instances improved upon by him.

Some years ago the company transferred Mr. Hoxie to its marine department at the factories in Bayonne, New Jersey, where he was enabled to familiarize himself with the manufacture of boilers, as well as to avail himself of the advantages of improved design and experimental work in producing economical steam generators. Later he was again sent to the Pacific Coast, and was assistant in charge of the installations of Babcock & Wilcox boilers in the battleships California, Milwaukee, and South Dakota, built at the Union Iron Works Yards in San Francisco. He was also in charge of boiler rooms during the trial trips of these vessels, and also of the Nebraska, built in Seattle by Moran, each of which had 16 water-tube boilers, a total of 64 in all. It is noteworthy that all these trials were very successful, without doubt due largely to the painstaking care in the manufacture and installation of the boilers.

During the late war period Mr. Hoxie contributed his services to the Navy and was stationed on the Pacific Coast, training crews in fuel oil burning and in the management of water-tube boilers. He was offered rank in the Navy, but preferred to exercise his abilities as a citizen and served his country as well, and perhaps with better results as such, being unhampered by regulations and ranking rules. He also at this time assisted the Navy in trials of the destroyers built at the Navy Yard, Mare Island, his extensive and practical knowledge of water-tube boilers and oil fuel handling being of great value. After the war Mr. Hoxie was in charge of the installation of all boilers of the scout cruisers Milwaukee, Omaha, and Concinnati, built by Todd Shipbuilding & Drydock Company at Tacoma. These vessels were of approximately 100,000 horsepower each. Later he was detailed to Wm. Cramp & Sons Ship & Engine Building Company at Philadelphia to handle the boilers of the cruiser Richmond, with the same type of boilers and same power. That all these trials were successful is a matter of record.

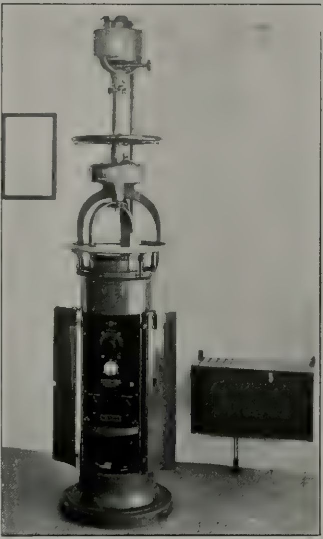
In addition to the above mentioned activities Mr. Hoxie has devoted himself to the development of oil fuel burners, and with remarkable results. In some instances where 12 and 14 burners were specified he has made changes whereby only 6 were required. This not only simplified piping and reduced expense of installation, but made material savings in fuel consumption and greatly increased the over-all efficiency of the boilers. Here it might be well to mention that in the cruiser Richmond, with geared turbine drive, a shaft horsepower hour was developed on a consumption of 0.85 pound of fuel oil. This was a remarkable achievement, but Mr. Hoxie thinks it can be beaten.

Discussing the comparisons between steam and diesel vessel propulsion, Mr. Hoxie says that he believes the diesel to have been an incentive to steam engineers to make greater efforts along their activities. In fact it has awakened the proponents of steam to the need of better results. And these results are being rapidly improved. With higher steam pressures and superheats and with turbine engines of more efficient type, the race for advantage is now very close, even in fuel costs. The steam plants have a great advantage from the standpoint of capital investment especially in the larger units. Mr. Hoxie also is of the opinion that when the present supply of oil becomes exhausted, it will be necessary to go back to coal. But, he says, this will be burned in powdered form, and with large furnace volume, under water-tube boilers.

Kolster Radio Compass Installed on American-Hawaiian Fleet

A New type of radio compass or direction finder has been designed and is now being built for small craft, as well as the larger ships, by the Federal Telegraph Company, manufacturers and distributors of the Kolster radio compass.

As distinguished from the original and older type wherein the receiver was a separate unit occupying considerable space in the chart room or pilot house, the receiving equipment is incorporated in a compass binnacle which makes it possible to utilize a maximum space of but 20 inches diameter. It is equipped with a deviation compensator which automatically applies corrections to the bearing taken, without the use of a correcting chart. It is unidirectional in operation and will immediately indicate whether the shore signalling station or ship is ahead, astern, port, or starboard. An illuminating dial has been provided for bearing taking when darkness is required in the pilot house or chart room. An extra jack has been provided for facilitating the furnishing of operating instructions to the ship's officers. All materials used in its construction are non-magnetic. The equipment is guaranteed accurate to within 2 degrees.



The new type Kolster radio compass.

The American Hawaiian Steamship Company recently placed an order with the Federal Telegraph Company to equip each of seventeen vessels with the Kolster radio compass, thereby making this equipment standard for their entire fleet of twenty-one vessels. The four vessels of this fleet which had heretofore been equipped, according to Ellery W. Stone, President of the Federal Telegraph Company, undoubtedly were the "proving grounds" for the Kolster compass, and it is gratifying indeed to the company that its unusual performance has prompted this exceptionally large order.

The Kolster radio compass recently participated in two of the most sensational rescues of the sea, the details of which most of us are acquainted. Indeed, according to the officers of the President Harding and the President Rosevelt, it is doubtful if the two ill-fated freighters, the Ignazio Florio and the Antinoe, could have been located without the aid of the compass. With the low visilibity caused by strong winds whipping the sea and the heavy spray, the Ignazio Florio could not be located even if the President Harding were approaching it. Captain Aniello Lauro of the Ignazio Florio could not radio the position of his ship to the Harding. The skies were overcast, they could not see the stars and so had no way of ascertaining her position. Her position was gauged by the Kolster radio compass of the President Harding.

In the case of the Antinoe her position was given 100 miles in error but by taking radio bearings every fifteen minutes the President Roosevelt located her dead ahead. The weather was so thick during the frequent squalls that visibility of a half mile was impossible at times.

Locating vessels in distress was doubtless not the reason for the equipping of the American-Hawaiian fleet, said Mr. Stone, as the chief function of the Kolster compass is to enable ships to proceed in foggy or thick weather, their position being known at all times, regardless of weather conditions. Vessels so equipped can also obtain a "fix" in fair weather by cross bearings of radio stations when far outside of the sight of land. The radio compass, according to G. R. Putnam, Commissioner of Light Houses, is the greatest aid to navigators since the invention of the magnetic compass. It is today recognized as standard equipment.

Three of the twenty-one vessels of the American-Hawaiian fleet which will be protected by Kolster radio navigation.

Trade Literature

Making Life Safe at Sea, by Arthur H. Lynch, is the title of a complimentary booklet being sent to interested persons by the **Submarine Signal Company,** 160 State Street, Boston.

This booklet is reprinted from an article by the editor of "Radio Broadcast," and is a "discussion of some of the scientific aids to navigation which will go a long way toward promoting our ocean commerce and reducing the hazard of sea travel." The discussion covers all phases and equipment of safe navigation at sea, cites many cases in the past where these could have been used to great advantage, and it is well illustrated with pictures of installations, graphs, tables, etc. It is a booklet well worth reading for anyone who is in any way responsible for or interested in sea navigation.

Submarine Signaling, Its Application in Peace and War, is the title of another interesting booklet which has been published by the **Submarine Signal Company,** 160 State Street, Boston, and is a reprint of an address delivered by Hammond V. Hayes, Ph.D.

This is a very beautifully made up booklet; it is printed on fine paper and illustrated with half-tone engravings of various installations, drawings, and maps. The subject, Submarine Signalling, is very well set forth, the address covering the development, uses, various phases and developments, and the many types of apparatus used in the sending of signals under water.

Worthington Locomotive Feedwater Heater and Boiler Feed Pump, Bulletin No. BK 1607-D, was issued in June 1926 by **Worthington Pump and Machinery Corporation,** 115 Broadway, New York City.

Arc Welding in G-E Factories is a 28-page booklet issued by the **General Electric Company,** Schenectady, New York, and designated as GEA-423. While this booklet covers only the application of the arc welding to the manufacturing problems of the General Electric Company, it is one that might be read with interest and profit by any factory or shop where this relatively new commercial process might facilitate production. The booklet may be had by applying to the General Electric Company and mentioning this magazine.

Baltimore, Maryland, has published a **Classified Directory** for 1926 which should be of interest and benefit to West Coast traders and manufacturers who are anxious to extend their interests on the Atlantic Coast. Baltimore is a seaport center of industry and commerce, and this directory contains a summary of Baltimore's manifold advantages as a manufacturing, industrial, commercial and shipping center.

Bonney Forge & Tool Works, Allentown, Pennsylvania, has issued Catalog No. 26 covering **Bonney Wrenches.**

The catalog contains detailed descriptions and sizes of the various types of wrenches manufactured by this company, also price-lists of all sizes. The catalog also contains an announcement that the company has the exclusive rights to manufacture and sell "CV" chrome vanadium wrenches.

Regulators for Generator Voltage Control are described under publication S.P. 1734 issued by the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa.

The problem of voltage regulation on constant potential circuits is one of considerable importance. Two distinct types of voltage regulators have been developed by this company to meet satisfactorily the various problems of adequate voltage regulation. One is the well-known vibrating type of voltage regulator; the other is the unique and remarkable rheostatic type of voltage regulator. This booklet, which is of 55 pages, describes these regulators in great detail and contains many halftone cuts, graphs, and tables illustrating the various points brought out.

Copies of the book may be had by applying to the company at East Pittsburgh, or any of its branches.

Some Developments in the Electrical Industry During 1925. This is a paper-bound book of 62 pages and index published by the **General Electric Company** and designated as GEA-355.

As the use of electricity has become so widespread, naturally the developments described cover a wide range of uses and applications, from the floodlighting of the old whaler Charles W. Morgan at South Dartmouth, Massachusetts, to the gorgeous lighting effects achieved during the California Diamond Jubilee Celebrations held at San Francisco. Between these two extremes are innumerable practical improvements and developments, including marine equipment.

The De Laval Method of Purifying Lubricating Oil and Fuel Oil. Bulletin No. 106 with the above title has been published by the De Laval Separator Company.

The booklet is made up of 48 pages on fine coated stock and is profusely illustrated. It is divided into 16 chapters, which cover the following features:

The need for a better way of purifying oils—Application of centrifugal force to the purification of oils—Adatability of De Laval purifiers to various lubricating problems—General problems of steam turbine lubrication—Purification of oil in turbine equipped power plants and waterworks—Purification of lubricating oil on turbine-driven vessels—Furnishing the internal combustion engine with clean lubricating and fuel oil—Economies effected by centrifugal purification of diesel lubricating oil in land plants—Idealized installation of Le Laval oil purifier on continuous by-pass system—Advantages of centrifugal purification of marine diesel engine lubricating oil—Centrifugal purification of fuel oil—Action of the De Laval oil purifier bowl—Illustrations of De Laval Oil purifiers—Laboratory apparatus and Auxiliary apparatus.

As the problem of clean lubricating and fuel oil, also of the removal of oil from ballast, is one that is taxing all operators of oil burning or oil carrying vessels, this bulletin should prove very interesting and instructive. Copies may be obtained from the offices of the company at 165 Broadway, New York; 600 Jackson Boulevard, Chicago; 61 Beale Street, San Francisco; or from any of their agents.

Bethlehem Charcoal Iron Boiler Tubes. Bethlehem Steel Company, Bethlehem, Pa., has published in very handy pocket size a booklet containing complete details concerning their charcoal iron boiler tubes made by the old-fashioned hand knobbling process. This is Catalog BT.

The booklet contains 70 pages and is profusely illustrated. A chapter sets forth the supremacy of the old-fashioned knobbling furnace for making pure charcoal iron for boiler tubes, another chapter is devoted to a brief history of iron making and its connection with charcoal iron boiler tubes, another chapter explains the manufacturing of Bethlehem charcoal iron boiler tubes. Other chapters give American Society for Testing Materials standard specifications for lap-welded charcoal iron boiler tubes, also tables giving weights, sizes, and areas of lap-welded tubes, price lists, and a handy index.

Victor Oxy-Acetylene Cutting and Welding Apparatus, Catalog No. 20, has been issued by the **Victor Oxy-Acetylene Equipment Co.,** 844 Folsom Street, San Francisco.

This catalog contains 32 pages and covers in a very complete manner the Victor welding, cutting, brazing, soldering, lead burning, and carbon burning equipment manufactured by this company. Victor equipment is fast becoming nationally known, and this catalog contains a full and detailed description and illustrations of the Victor torch and the principle of its operation. Victor equipment for general, cutting work, heavy duty, machine, and light cutting are illustrated and described, also all auxiliary equipment and parts.

Catalog No. 20 may be procured from the company at 844 Folsom Street, San Francisco.

Marine Insurance

Edited by JAMES A. QUINBY

Partial Loss Claims

AT the risk of offending the gray-bearded experts who may be readers of this column, we revert to a more or less elementary discussion of the method of calculating a partial loss on goods under a marine policy.

The Lament of the Loss Man

When a million dollar cargo loss necessitates some stalling
I can always
Find a precedent—
(Or pay it)
Or if damage to a hull reaches figures quite appalling
Our lawyers
Meet and settle—
(Or delay it)

REFRAIN (Please do.)

But how about the little things that clutter up my file?
A musty sack of walnut meats—
A rusty window frame—
A dollar's worth of overhead,
A nickel's worth of claim—
Oh, (—(—the little claims that never come to trial.

Of course, the simplest form of loss, from the viewpoint of all concerned, is the so-called "actual" or "absolute" total loss. If the cargo is destroyed by a peril insured against—consumed by fire or washed overboard and irretrievably lost—the underwriter's liability is fixed by the face of his policy. In such a case there is usually no excuse for argument, and the assured is only too happy to receive the policy value of his shipment, even though he may have under-insured it.

Similarly, if the goods are so damaged by a peril insured against as to lose their identity and have to be sold at an intermediate port, the underwriter pays the face value expressed in the policy and receives as a credit the net proceeds from the sale of salvage after deducting expenses attendant thereon.

By far the largest proportion of every-day losses, however, present cases involving partial damage to the subject matter insured, and it is in computing the extent of these losses that the parties to the insurance contract often run afoul of misunderstanding. The assured, especially if he has had little or no experience with marine policies, is apt to contend that he should be recompensed for his actual loss, without reference to the relation which that loss bears to the policy valuation.

Example of Market Fluctuation.

Let us take as an illustration the case of Mr. I. Import, a buyer of peanuts. Since we're going to deal harshly with him, we can assume that the "I" stands for "Inland," or even "Ignorant."

He buys a small lot of goods in China for shipment to San Francisco. As it appears that the peanuts will have a value on arrival of $480, he covers them by a marine insurance policy for $500.

Now it transpires that the vessel bearing our precious peanuts suffered the usual unusually heavy weather, causing her to roll and strain; that she encountered mountainous seas, with the wind howling a full gale from the southeast; that she shipped enormous quantities of sea water, causing her to roll and strain heavily. If you don't believe this, refer to any carefully extended protest. At any rate, the sea water damaged the peanuts.

It also transpires (—that's a good word—, I like it) that market conditions fluctuate while the good ship is on her voyage, due to the unexpected invention of synthetic peanuts, and the sound value of the shipment on arrival turns to be only $300, instead of $480.

Mr. Import, being notified of the arrival of his damaged goods, immediately rushes down to the wharf and sells the shipment for $90 to an Italian maker of peanut butter. Does he then calmly consider how much of his loss is due to the drop in the market? He does not—. He Charlestons to his underwriter and presents claim for his actual loss, somewhat after this fashion:

Sound value	$480
Proceeds damaged . .	90
Claim	$390

On this theory, he would receive the same for his goods—$90 from the sale, plus $390 from his insurer—as if the market had not taken a tumble. To disclose the fallacy more clearly, let us suppose that the precocious inventor mentioned above had turned his genius in a different direction, and had discovered a method of making Manhattan cocktails from peanut brittle. Under such circumstances, the amount realized from the sale of the damaged goods might well have exceeded $480, in which case our friend, to be consistent, would have to release his underwriter from any claim whatever, despite the fact that the subject matter of the insurance had actually suffered damage from a peril insured against.

Merchant's Loss vs. Underwriter's Liability.

This theory, of course, is entirely wrong, since it involves the underwriter in hazards incident to the rise and fall of the market and makes him, in effect, a buyer on margin of the goods which he insures.

To escape this result, the proportion of loss borne by the underwriter is figured by the following formula:

> Subtract the proceeds of the damaged goods from the theoretical sound value on the day of arrival, thus obtaining the percentage of depreciation due to the peril insured against. Apply this percentage to the insured value in order to arrive at the insurer's liability.

In the case just cited, the proper manner of presenting claim therefore be as follows:

Sound value	$300
Proceeds damaged	90

Arthur M. Brown **EDWARD BROWN & SONS** *Arthur M. Brown, Jr.*

MARINE DEPARTMENT—*Harry W. Browne, Manager*

PACIFIC COAST GENERAL AGENTS

THE GLOBE & RUTGERS FIRE INSURANCE CO., INC.

200 BUSH STREET, SAN FRANCISCO

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA and SANSOME

JOSEPH HADLEY,
European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Resident Agent for Oregon
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, MANAGER, PACIFIC NORTHWEST BRANCH

Loss ....$210, or 70%
Claim...... 70% of insured value ($500)....$350.

On a rising market, both the sound and damaged values would be higher, and the percentage of depreciation would normally remain constant.

Gross Values Should Be Used.

The above principle was clearly established by the English courts as early as 1761, in the case of Lewis vs. Rucker. Even after this rule of adjustment was incorporated into the law, however, there was a difference of opinion as to whether the amount of depreciation should be ascertained by a comparison of the gross or net values of the sound and sea damaged goods. It was not until 1802 that Lawrence, J., in the case of Johnson vs. Sneddon, decided that the percentage which the insurer pays should be ascertained by comparing the gross proceeds of the sound and damaged sales.

The Marine Insurance Act (1906) of Great Britain, provides as follows, (Sec. 71, (3)):

> "Where the whole or any part of the goods or merchandise insured has been delivered damaged at its destination, the measure of indemnity is such proportion of the sum fixed by the policy in the case of a valued policy, or of the insurable value in the case of an unvalued policy, as the difference between the gross sound and damaged values at the place of arrival bears to the gross sound value."

It is only by this method that absolute freedom from the effect of market fluctuations can be obtained. If the net values, rather than the gross, are used, and freight and charges are deducted, a variation of the percentage of depreciation will result, depending on the size of the amounts involved. As the court in Johnson vs. Sneddon points out, "If you take equal quantities from two unequal quantities, the smaller such unequal quantities are, the greater will be the difference between their remainders."

So to be technically correct, therefore, the underwriter's liability in any given case of particular average on cargo should be obtained by first finding the percentage of depreciation as shown by the comparison of the gross sound and damaged values, and then applying this percentage to the insured value.

In the Pacific Coast market, it is customary to obtain the sound arrival value by means of a surveyor's estimate. In most instances, the goods involved are standard commodities, with a market value which is more or less constant, and it is only in those comparatively rare cases where unique articles are damaged that it is difficult to arrive at a true estimate.

Practice of Underwriters.

Although the insurer's liability, technically speaking, is limited by the principles set forth above, it is seldom that an underwriter's loss man adheres rigidly to the cut and dried formula in his adjustment. In many cases the settlement of particular average on a total loss, or so-called "salvage" basis works no hardship on either party to the insurance contract. This is quite apparent where the market is steady and the insured value approximates the real value of the goods.

It must be further admitted that even the best of our companies are—perhaps naturally—quite willing to make payments to valued clients, even where there may be no liability whatever under the policy.

These irregularities of practice naturally give rise to misunderstandings on the part of assureds as a class. If a policy-holder succeeds in collecting one claim on a salvage basis, he naturally expects to collect all future claims in the same manner, and it is very difficult to talk theory to him when contrasting values bring about a situation like that set forth in our hypothetical case above.

If there is widespread ignorance of the true method of settling particular average claims on cargo, the insurer must hold himself at least partly to blame. It is unlikely that we shall see the day when every claim is considered in a strictly technical light, but the situation might be improved if a claim form were used, outlining the proper method of settlement, and care taken to advise the assured of every deviation therefrom.

Blowing Our Own Horn

Of the three great marine insurance marts of the world, London, New York, and San Francisco, the local center, while by no means the largest, certainly has nothing to be ashamed of, particularly from the viewpoint of the Pacific Coast buyer of insurance. We take very little stock in the ancient bunk about local patriotism and civic pride. A man is going to buy his insurance, as well as his other necessities, in a market which offers him the most for his money, whether it be California Street or Timbuctoo. This has been proved many times, and is strikingly apparent in the willingness of English shipowners to have their vessels constructed in German yards.

But if the merits of coverage are equal, there should certainly be a trend toward patronizing local industry. If the Coast shipper or importer places his business here, he is in a position to maintain close touch with its details, and the personal acquaintance of his underwriter is sometimes worth dollars and cents to him.

Secondly, the local insurance contract stands out as preeminently desirable from the angle of providing immediate and satisfactory general average security. Many western firms who have been in the habit of buying their goods c.i.f. from the Atlantic Coast or other points, and allowing the shipper to place the marine coverage, have been subjected to vexatious delays in obtaining their goods after a general average has been declared.

Following a general average, the shipowner is not only entitled, but compelled, by law to protect a lien on cargo in behalf of the various interests associated in the venture. An insurer's guarantee has, in America, come to be the generally accepted form of security, in return for which the shipowner releases the cargo to the consignee. But if the insurer be a foreign corporation owning no property attachable in the United States, its paper is not regarded as satisfactory security by average adjusters, and a cash deposit is exacted in lieu of a guarantee.

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Manager, Southern California Marine Branch
740 SOUTH BROADWAY
LOS ANGELES

CHARLES R. PAGE, Manager
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

309 COLMAN BUILDING, SEATTLE, WASHINGTON

And even if the insurer be a well-known and solvent concern, its location at a point other than the port of destination is apt to result in serious delay, due to the necessity of telegraphing particulars. And delay in cargo delivery, even if only a few hours, is usually synonymous with wear and tear on the pocketbook and the disposition.

On the other hand, if the purchaser buys f.o.b. point of origin, and arranges his own insurance at the point of discharge, these difficulties are eliminated, for in such case the consignee, insurer, and adjuster are so centrally located that a few minutes on the telephone will serve to arrange all the necessary details.

Not infrequently (the pessimistic underwriter is inclined to say invariably) declarations under open contracts are not yet made when the goods in question become liable for general average charges. If the insurers are located at the port of destination, the omission can be easily remedied. Under a policy taken out by the shipper, further delay inevitably ensues.

But even if the convenience of geographical location is ignored, Pacific Coast offices have in many ways proved that they have no superiors. In comparison with other markets, they pay their losses, and pay them promptly. London companies, due perhaps to the slowness of the mails, may be as long as six months in settling a recognized claim. New York companies, due we fear to the slowness of the males, may be as long as never, and as the bar-room chanteys have it, never is a long, long time.

As a single instance of consideration for the interests of their clients, it should be noted that the members of the Board of Marine Underwriters of San Francisco who were interested in the cargo of the late ill-fated "Suduffco" met and agreed to pay total losses against loan receipts long before the New York underwriters had taken concerted action and some weeks prior to the date when the vessel was posted as missing at Lloyd's.

After calm consideration of the foregoing, we are inclined to insert our thumbs in our suspenders (Valentino wears 'em) and cock our derby at a slightly greater angle over our collective brow. Is there any reason why the Pacific Coast business man should shop afield for his marine insurance?

How Many Hairs Has a Dog?

THERE is one question in the bright lexicon of marine insurance that deserves to be ranked on the upper shelves of inscrutability, along with How old is Anne? and Why does a chicken cross the—er—Sloat Boulevard?

We refer to the vexing problem of hull valuations, which seems to pop up like a jack-in-the-box to face underwriters and adjusters at every turn, whether the matter at issue be insurance or general average.

The valuation of any given item of cargo is comparatively simple, since there is usually a well established market price on the goods at the port of discharge, and even if there is no such standard, the value may easily be obtained by estimation, since goods, in their very nature, are designed to be sold.

Ships, however, are not subjects of barter—they are built to use, not to sell, and any approximation of their sale value is accordingly artificial in the extreme. Our best known text writers either ignore this difficulty by blandly observing that the ship shall contribute in general average upon her "actual value" at the port of destination (less certain deductions) or summarize the methods of estimation which have been used in the past, carefully pointing out the defects of each.

Congdon, our American authority, in his "General Average", 2nd Ed., p 168, leans to the theory that the present value of a vessel should be established by her cost of replacement, less a reasonable depreciation for wear and tear, depending on the condition of the ship in question.

Lowndes, ("General Average", 6th Ed. p. 358) says, "On principle, a merchant ship being simply a machine for earning freights, the real value of a machine to her owner is the present capitalized value of all her future earnings, so long as she can be used as a ship, after deduction of her working expenses; to which must be added the present value of the sum for which she may eventually be sold to be broken up. But, as the data for such calculation do not exist, we have to adopt other tests in the way of approximation."

He then goes on to observe that in estimating a hull value, recourse should be had to experienced shipowners, for their opinions, and an inquiry made into the ship's first cost, from which an appropriate allowance should be made for depreciation, in order to arrive at a sum for which a reasonable owner would sell.

The diligent reader gains nothing from such learned passages save that estimating the value of a ship is far from being a lead-pipe cinch. This impression may be confirmed any time by catching a shipowner, an average adjuster, and a cargo underwriter involved in a general average, and listening at the keyhole while they argue over the contributory value of the vessel.

Not the least of the adjuster's worries is due to the failure of some vessel owners to comprehend the purpose for which valuations are used. Marty Detels used to tell the story of an interview which occured when he was drawing up a general average on an old tin teakettle which we shall call the "Frank N. Hampton."

Two of the co-owners were in his office, and he asked their offhand opinion of the "Hampton's" value, as a sort of size-up before getting a certificate from a hull surveyor. The following eulogy ensued:

"Well, she's a fine boat."

"Sure is. We could get $50,000 for her any time."

"$50,000. . ? She's worth $60,000 if she's worth a cent."

"I guess you're right. I forgot those new boilers we put in last year."

"And she's chartered for three voyages. Huh. . . . We wouldn't take a cent less than $75,000 for her."

But after Marty had explained that he merely wanted her value to estimate the basis on which she would be required to pay her contribution in general average, he heard another chorus entirely.

Balfour, Guthrie & Company
(Established 1869)

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"Oh."

"Oh, I see.

"Well, she's gettin' pretty old."

"And her boilers are rusty."

"And she's a coal-hog"

"And freights is bad....I guess, takin' it by and large, that ship ain't worth a cent over thirty thousand."

Freights, Charters, Sales

July 15, 1926.

THE United Kingdom grain market remains at 30/- for all positions with no great activity.

The Trans-Pacific lumber market has improved, with Japan at $10.50 and Australia at $13.50 to $14. There is quite a demand for wheat to Japan with rates at $4 to $4.25 by liner, while for full cargoes October/November owners are asking $4.50 to $4.75.

Lumber to the west coast of South America remains at about $13, with plenty of liner space to take care of the demand.

Owing to the large general merchandise movement to the Atlantic seaboard, lumber rates have improved and are now quoted at $13.

The following steamers are reported fixed with grain to the United Kingdom/Continent: British steamer Ethelfreda, 30/-, August, Kerr Gifford & Company; Swedish steamer Lulea, 30/-, September/October; British steamer Argalia, Portland or Puget Sound, 31/3, August/September, option Vancouver loading, 30/6, Balfour Guthrie & Company; Swedish motorship Bullaren, August, Kerr Gifford & Company; French steamer Emilie L. D., October, Kerr Gifford & Company.

The following fixtures are reported for lumber to the Orient: Japanese steamer Fukko Maru, Yokohama, June, Nakagawa & Company; Japanese steamer Malta Maru, Japan, July, same charterers; Japanese steamer Taibu Maru, same; British steamer York City, September, lump sum, W. L. Comyn & Company.

The American steamer Pacific Pine is reported fixed with lumber from Columbia River to New York and Philadelphia, July loading, by Charles R. McCormick & Company.

The following time charters are reported: Italian steamer Burma, British Columbia to Japan, one or two trips, delivery Japan, lumber, 75 cents, June, Canadian American Shipping Company; Norwegian steamer Key West, North Pacific to Australia, delivery San Pedro, redelivery Australia, two trips, $1, July, W. L. Comyn & Company; Japanese steamer Choyo Maru, Pacific trade, 18 months, Ocean Transport Company; British steamer Grangepark, British Columbia to Japan, four to five months, lumber, Canadian American Shipping Company; Danish motorship Nordval, 12 to 18 months, delivery North Pacific, September, W. L. Comyn & Company; American steamer Catherine G. Sudden, four months' coasting, September, Dawes Shipcrane Company; British steamer Min, delivery New Zealand, redelivery Australia via North Pacific, one trip, July, J. J. Moore & Company, Inc.; Norwegian steamer Rigi, delivery Newcastle, relivery Australia via North Pacific, one trip (continuation) J. J. Moore & Company, Inc.; British steamer Welsh City, delivery San Francisco, redelivery Japan, two trips, August, W. L. Comyn & Company.

The following sales are reported: American schooner Irene, McCarthy & Wilvers to John West; Mexican schooner Oaxaca, Mexican States Line to Captain Allan Hancock, Los Angeles.

PAGE BROTHERS, Brokers.

Trade Literature

Power Specialty Company, 111 Broadway, New York, manufacturers of Foster superheaters, economizers, oil heaters, air heaters, and water-cooled furnace surfaces, has issued an interesting broadside of 8 pages describing **Foster Water Backs.** This is well illustrated with actual installations and also line drawings.

Increase Marine Profits. This is Bulletin 143 of the **Diamond Power Specialty Corporation,** Detroit, Michigan.

The booklet, which contains 48 pages, tells how marine profits may be increased by the use of Diamond soot blowers for all types of marine boilers. Some statistics are given concerning the bad effects of soot on the boilers of vessels, and this bulletin endeavors to point out the best developed and most effective means of keeping the heating surfaces of marine boilers clean. The bulletin is profusely illustrated with various soot blowers and their applications to water-tube boilers and Scotch boilers; also a number of testimonials from a widespread number of engineers; photographs and names of vessels equipped with this product; and various other data which should be of great interest to all operators of coal burning craft.

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Personals and Items of Interest

Peter A. Sensenig has joined the publicity staff of the Ingersoll-Rand Company, 11 Broadway, New York. He will specialize on the I-R oil engines for marine, locomotive, and stationary service.

Mr. Sensenig was previously employed for eight years in the Department of Publicity of the Westinghouse Electric and Manufacturing Co., and was located at East Pittsburgh, Atlanta, Philadelphia, and New York.

He was chairman of the Exhibits Committee of the American Marine Exposition held last November in New York, and is a member of the Propellor Club, Poor Richard Club, New York Maritime Exchange, and American Society of Port Authorities.

The Sixty and Two Convention of salesmen and representatives of Jenkins Bros., manufacturers of valves and mechanical rubber goods, was held June 7, 8, 9 and 10 in commemoration of the sixty-second year of Jenkins Bros.' business.

The convention took on an international aspect, as not only were all the United States salesman in attendance, but representatives from Canada, England, Cuba and Mexico as well.

The program included meetings at the executive offices, 80 White street, New York, trips through the bronze and iron valve factories of Jenkins Bros. at Bridgeport, and Jenkins Bros. Rubber Division at Elizabeth, where was seen the manufacture of Jenkins' sheet packings, discs, pump valves, and other mechanical rubber goods.

On the evening of June 9, a banquet at the Hotel Biltmore, New York, was tendered to over a hundred men of Jenkins Bros. organization, with President Farnham Yardley, the toastmaster.

More Gyro Compasses and "Metal Mikes."—The Standard Oil Company (Calif.) has recently ordered eight more gyro-compasses and gyro-pilots from the Sperry Gyroscope Company. These additions to the present equipment of their tanker fleet are to be installed as soon as possible. The performance of the gyroscopic direction indicator and automatic helmsman has proved so satisfactory that the oil company is extending the use of this aid to safe and economical navigation to their other ships.

The United States Army Transport Service has also adopted the "Metal Mike" for their entire fleet, and the Sperry Company has recently completed installations on the transports Chateau Thierry and Cambrai, and are now installing their equipment on the Thomas.

W. B. Meyers

The Wm. Powell Company, Cincinnati, Ohio, announce the opening of their new office at 39 Stevenson Street, San Francisco,, with W. B. (Bill) Meyers as their direct representative. Bill Meyers is a new comer in the marine field of the Pacific Coast, but has had previous experience along the Great Lakes and Atlantic seaboard, and is, therefore, conversant with all details pertaining to Powell bronze, iron, and steel valves for marine service.

The Wm. Powell Company are enjoying a wonderful reputation in the marine field since their foundation in 1846 as manufacturers of high grade Dependable Engineering Specialties, this reputation being achieved through careful design, proper materials, and expert workmanship. As a precaution for further protection, Powell valves undergo severe hydrostatic tests, with valves both opened and closed, followed by a rigid inspection, which insure the user against any possible defect.

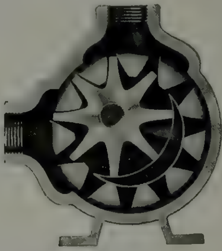
Powell bronze union bonnet, bronze bolted yoke bonnet, iron body bronze trimmed, and steel body monel trimmed gate and globe valves conform to the general rules and regulations prescribed by the United States Steamboat Inspection Service.

The Wm. Powell Company also manufacture a complete line of bronze lubricators, oil cups, grease cups, cylinder cocks, and fusible plugs.

Particular mention is made of the Powell White Star valves, which are of sturdy construction and the standard of superiority in the valve world, with their Powellium nickel seats and discs, the discs being reversible, renewable, and regrindable.

The Wm. Powell Company Dependable Engineering Specialties are distributed for immediate service at San Francisco by the General Machinery and Supply Company, at Los Angeles by Neilan-Schumacher and Company, and at San Diego by Machinery Pipe and Supply Company. Steamers Manukai and Manulani of the Matson Navigation Company, are completely equipped with Powell "Dependable" valves.

The Bridgeport Brass Company, of Bridgeport, Conn., announces the appointment of William J. Butler as salesman of Bridgeport-Keating flush valves, Plumrite brass pipe, and Bridgeport tubular plumbing goods, calling on architects, jobbers, and plumbers in Northern New England. Mr. Butler will make his permanent residence in Boston.



Section of the Viking Rotary Pump.

Viking Rotary Efficiency

ROTARY PUMPS owe their high efficiency to the manner in which the liquid is directed or controlled after it enters the pump. The accompanying illustration shows a cross section of one of the prominent makes of rotary pumps (Viking). The power is applied to the rotor, the outer annular gear, as it revolves. The idler or inner gear is also operated, thus creating a suction at the intake port.

The rotor and idler mesh at a point between suction and discharge ports forming a complete barrier. As the cogs of the idler draw away from the rotor, a suction is created and the opening made, which is filled with the liquid being pumped. The spaces between the cogs of both idler and rotor around to the point where the idler cogs again mesh into the rotor are filled with liquid. The meshing of the cogs here forces the liquid out through the discharge port. The action creates a steady, constant discharge of liquid. There is no loss of power due to whirling or churning in the pump casing. Liquid drawn into the pump is passed on through the pump and out the discharge during the same revolution. Pumps of this type operate at slow speeds, yet have the advantage of delivering a greater volume of liquid than other types that embody the same degree of inherent efficiency.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

FERRYBOATS AND FERRY TERMINALS FOR GOLDEN GATE FERRY COMPANY.

The Golden Gate Ferry Company, San Francisco, A. O. Stewart, president, and Harry Speas, manager, has announced that they shall order three and possibly four new ferryboats at once and start construction of an 18,000 foot pier at Berkeley. The initial investment will be about $2,250,000.

This announcement was pursuant to the permit granted to the ferry company on July 7 by the California Railroad Commission, authorizing the company to operate a vehicular ferry between the foot of Hyde Street, San Francisco, and Berkeley. The company previously ordered three diesel-electric ferryboats from the General Engineering & Drydock Company, the order being changed to one, which was completed and went into service June 27. As all the boats which have been built for the company, the Golden Gate, Golden West, and Golden State, are of diesel-electric propulsion, it is practically certain the additional boats will be of similar type.

The ferryboat Golden State, which went into service June 27, is 240 feet over-all, 44 feet molded beam and 17 feet molded depth, and is equipped with Pacific-Werkspoor diesel engines connected to General Electric generators.

The company underwent a change in incorporation recently in order to obtain sufficient funds to carry on the increased business and provide necessary equipment.

KEY SYSTEM TO EXPAND

The Key System Transit Company, operating passenger service across San Francisco Bay and operating extensive interurban lines in Alameda County, have applied to the California Railroad Commission for permission to expand and improve their service. One of the applications is for permission to operate an automobile ferry service from San Francisco to the Key Route pier at Oakland. The other two applications are for improvements to their Oakland pier and rail lines.

It is stated that the improvements would involve an expenditure of $4,000,000, not including the cost of the two new ferryboats now under construction at the Moore Dry Dock Company. In the event of this company operating an automobile ferry service, the reconstruction of the ferryboats San Francisco, Claremont, and Fernwood would be undertaken, and possibly the construction of an entirely new boat. Additional piers and viaducts over the Southern Pacific tracks would also be necessary.

CONTRACTS NOT YET AWARDED ON MOUNT VERNON AND AMERICA.

Decision has not yet been made by the United States lines on the award of contracts for the reconditioning of the steamship Mount Vernon and the reconstruction and conditioning of the steamship America, bids for which were opened in June. It is the opinion of officers of the Shipping Board that the bids on the Mount Vernon are too high, and plans may be revised somewhat so as to bring the cost of the work nearer the $2,000,000 mark.

THREE CUTTERS FOR COAST GUARD.

It is reported that bids for the construction of machinery for the three new Coast Guard cutters, for which an expenditure of $1,000,000 has been approved by the Director of the Budget, will be called for about the first of October, and bids for the hulls will be called about the first of 1927. One of these cutters will probably be built on the Pacific Coast, as it is understood that three out of the ten cutters authorized at the last session of Congress, will be for Pacific Coast service. The cutters will have a tonnage of about 1800 and speed of about 16.5 knots.

FERRYBOATS FOR NEW YORK.

The Commissioner of Plant and Structures of New York City, A. Goldman, Municipal Building, opened bids the latter part of June for the construction of two or three steel ferryboats. The boats are to be propelled by diesel engines geared to two screws and are to be 101 feet 6 inches over-all, 30 feet beam, and 12 feet molded depth. The engines will be of 300 brake horsepower. Tenders were asked on McIntosh & Seymour, Ingersoll-Rand, or Nelseco diesel engines. Todd Drydock, Engineering, and Repair Corp. Brooklyn, was the low bidder.

BIDS OPENED FOR GOVERNMENT BARGES.

Bids were opened on July 16, in the office of Irving Cox, 341 Madison Ave, New York, for the 15 barges and three towboats which will inaugurate the traffic on the upper Mississippi under the Inland Waterways Corporation, the Government agency which now maintains barge traffic on the lower Mississippi and the Warrior rivers. This was announced at the Department of War on July 13.

The new equipment will represent an outlay of $750,000 and will be used in the service between St. Louis, St. Paul and Minneapolis. The boats are to be built by interests in the Twin Cities, who will turn them over to the Government for operation by the Inland Waterways Corporation. It is expected they will be ready by the end of the current year.

General H. T. Ashburn, director of the Inland Waterways Corporation, recently made a test trip over the upper Mississippi barge route with several types of boats in order to determine the type best suited for this route. The designs were prepared by Mr. Cox, a marine architect, from the data obtained on this voyage, and the bids opened on July 16 were according to his designs and specifications.

The Department of War has also announced that the first 10 of the new 2,000 cargo barges to be used by the Inland Waterways Corporation on the lower Mississippi will be launched at Pittsburgh, Pa.

RIVER STEAMBOAT FOR COLUMBIA.

The Harkins Transportation Company, Portland, Oregon, have announced that they are planning a passenger river steamer to operate between Portland and Astoria on the Columbia River. The boat is to have a passenger carrying capacity of 700, to be of steam or steam turbine power, and with a speed of 25 knots.

SEATTLE FIREBOAT.

W. C. Nickum, formerly vice-president of the Todd Drydock & Shipbuilding Corporation, Tacoma, Washington, is now drawing up plans and specifications for the City of Seattle for a fireboat to cost about $200,000. The money is now available for the construction of the boat. Last year when fireboat L. A. City No. 2 was put in operation at Los Angeles Harbor, Seattle engineers were favorably impressed with the type of boat.

The Nelson Steamship Company of San Francisco, James Tyson, president, has purchased five freight steamers from the Shipping Board. These are of the type constructed on the war program by the Submarine Boat Corporation and are the Fort Armstrong, Morsadak, Buffalo Bridge, Suwied, Chetopa, and Tashmoo. The vessels are to be overhauled and conditioned for the lumber carrying trade upon their arrival on the Pacific Coast. They are 335 feet 6 inches over-all, 46 feet molded beam, 28 feet 6 inches molded depth, 23 feet loaded draft, and have a deadweight capacity of 5350 tons. The power plant consists of Westinghouse steam turbines and Falk reduction gears developing 1500 shaft horsepower.

Pusey & Jones Company submitted the lowest bids for the construction of an excursion steamer for the Hudson River Day Line.

Bids were opened July 8 for a new day passenger boat to replace the Washington Irving, which sank at a Hudson River pier following a collision. J. W. Millard is the designer.

The vessel will be 250 feet between perpendiculars, 46 feet beam, and 17 feet 3 inches molded depth to main deck. The propelling machinery will consist of a 4-cylinder triple expansion engine directly connected to a single screw. Four Scotch oil-burning boilers will supply the steam; although bids were asked also on Babcock & Wilcox water-tube boilers. The working boiler pressure is specified at 185 pounds per square inch, and the engine must run at 125 revolutions per minute, to develop 2700 indicated horsepower.

The hull is to be of steel, and accommodations will be provided for 3500 day passengers. The owners will supply practically all of the interior furnishings.

British Columbia Public Works Department, Vancouver, B. C. has asked for bids for the construction of a modern motor passenger and auto ferryboat for service between Kelowna and Westbank on Okanagan Lake.

Southern Pacific Ferry Bids Opened

Bids were opened on July 7 for the construction of five steel diesel-electric vehicular ferryboats for the San Francisco Bay service of the Southern Pacific Company. The recent action of the California Railroad Commission in granting permission to the Golden Gate Company to operate ferry service between San Francisco and the east side of San Francisco bay will have some weight on the decision of the Southern Pacific Company in awarding contract for additional ferryboats, as the new ferry service will be in competition to their vehicular ferry service.

It is reported that seventeen engine builders submitted bids for the generating power for these boats; but that the selection has simmered down to five engines, three manufactured on the East Coast and two on the Pacific Coast. The order for hulls will probably be let to a San Francisco Bay yard.

Bids were asked by the Southern Pacific on from three to five vehicular ferryboats 256 feet long and 44 feet 10 inches beam, with draft of 11 feet 3 inches. They were to have a capacity of 80 automobiles and equipped with seating capacity of 500 persons struction of a ferry slip at Alameda to accommodate their proposed vehicular ferry service from San Francisco and a dining room to serve 50 at one time. The vessels are to be of diesel-electric drive, which is a departure from the usual Southern Pacific ferry prime mover.

Building Vehicular Terminal at Alameda.

This company has started the con- to Alameda. The Alameda terminal will cost about $200,000. The Southern Pacific Company have heretofore operated only a foot passenger ferry service to Alameda.

Recent Shipbuilding Contracts

Newport News Shipbuilding & Drydock Company is reported to have been awarded the contract for Red D Line for the construction of passenger and freight steamer for coastwise service. The vessel will be 335 ft. 4 in. over-all, 51 ft. beam, 18 ft. draft. She will have Newport News-Curtis turbines developing 4000 shaft horsepower, steam to be supplied by two water-tube boilers burning oil and with superheaters. The vessel will have a cargo capacity of 3560 tons deadweight. She will carry 112 first class passengers and 24 second class, with a crew of about 77.

It is understood that the Red D Line is contemplating the construction of additional tonnage.

Rice Bros., East Boothbay Harbor, Maine, has an order from Bureau of Canals for a steel towboat to be equipped with Kahlenberg semi-diesel engine. The cost will be $37,970.

Anderson and Cristofani, boat builders at Hunter's Point, San Francisco, have received an order from A. W. Lawson, marine engineer and surveyor of San Francisco for two motorboats for South America. They will be 35 feet long and powered with 20-horsepower engines.

The American Ship Building Company, Cleveland, Ohio, has received orders for three large bulk freighters for Great Lakes Service. One order is for two freighters for Pickands, Mather & Company 580 feet between perpendiculars, 60 feet beam, and 20 feet loaded draft. They are to have a deadweight capacity of 12,000 tons and a speed of 13 miles. Steam engines and Babcock & Wilcox boilers will furnish propulsion power.

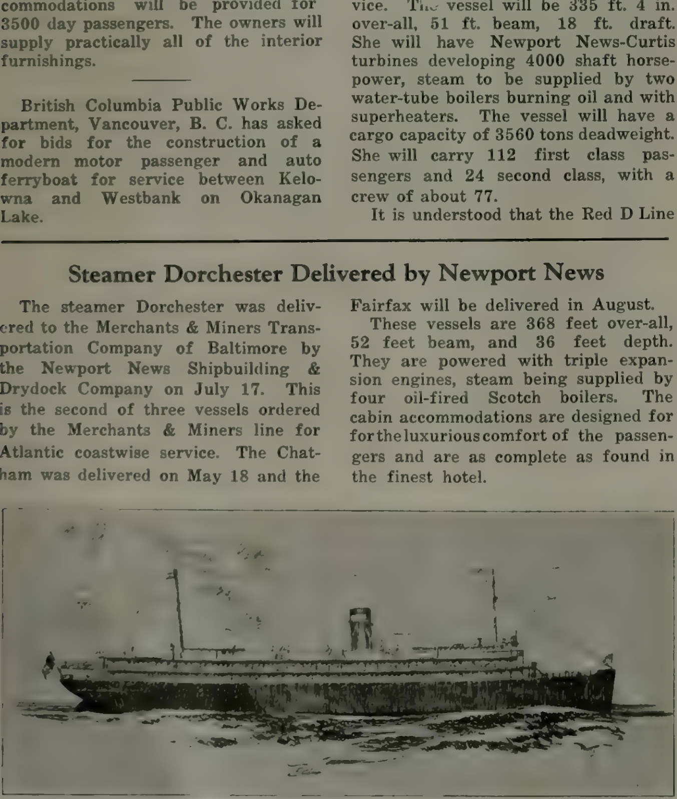
The other freighter, for the Inland Steel Co., is to be 596 feet between perpendiculars, 60 feet beam, and 20 feet loaded draft. This steamer will have triple expansion engines and three Scotch boilers. Capacity will be 13,500 tons deadweight and speed will be 13 miles.

Dravo Contracting Company, Pittsburgh, Penn., has an order for one ladder type sand and gravel dredge for the Pittsburgh Plate Glass Company. They are building four steel whirler boat hulls for their own Contracting Dept. and two steel barges for stock.

Steamer Dorchester Delivered by Newport News

The steamer Dorchester was delivered to the Merchants & Miners Transportation Company of Baltimore by the Newport News Shipbuilding & Drydock Company on July 17. This is the second of three vessels ordered by the Merchants & Miners line for Atlantic coastwise service. The Chatham was delivered on May 18 and the Fairfax will be delivered in August.

These vessels are 368 feet over-all, 52 feet beam, and 36 feet depth. They are powered with triple expansion engines, steam being supplied by four oil-fired Scotch boilers. The cabin accommodations are designed for for the luxurious comfort of the passengers and are as complete as found in the finest hotel.



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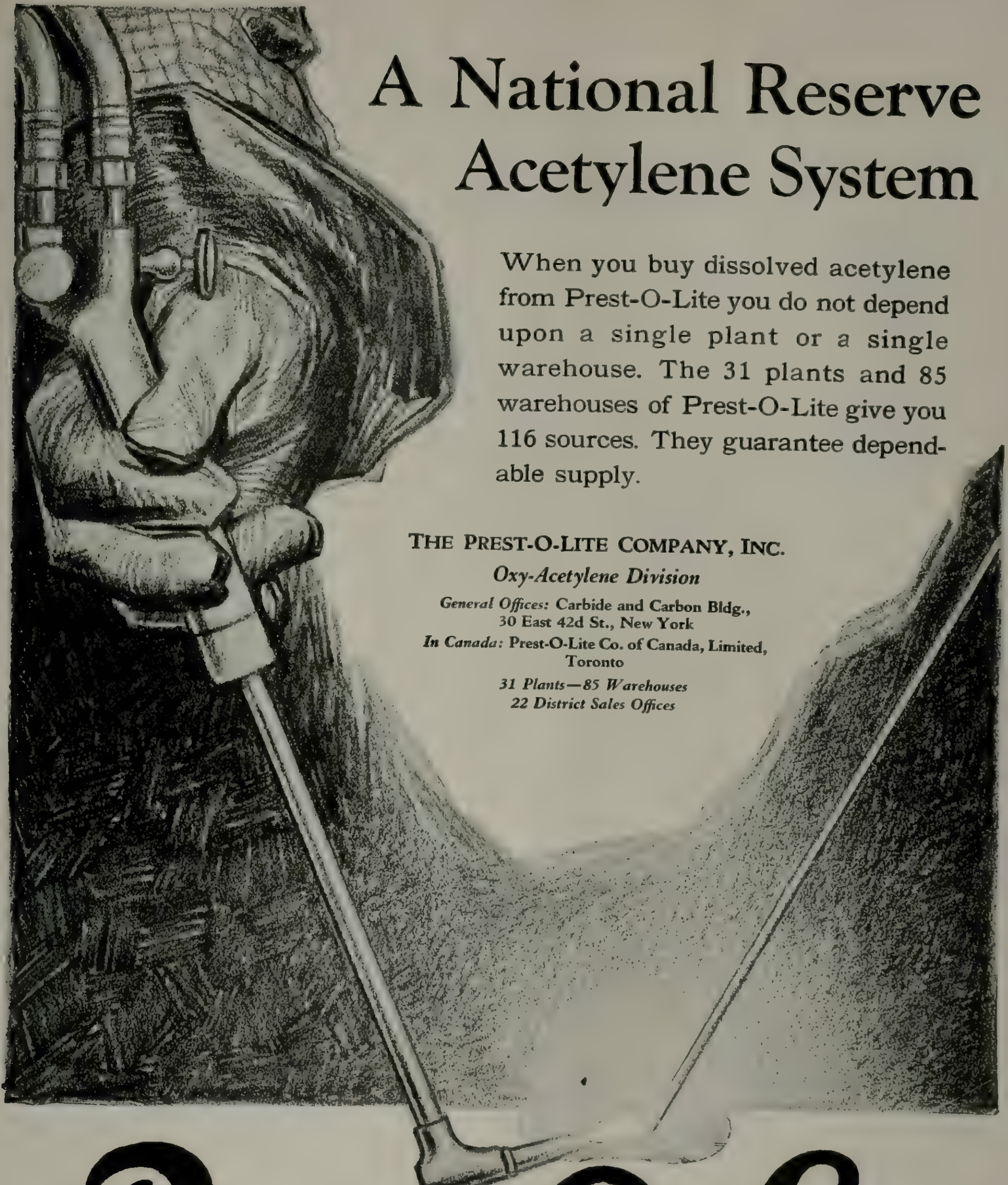

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In Pacific Coast *Shipyards*

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The Sun Shipbuilding Company, Chester, Pa., has an order for a sternwheel towboat for the International Petroleum Company to be 160 feet long, 44 feet beam, and 5 feet depth, with draft of 3 feet 3 inches, and of 750 indicated horse power.

This company also has an order from the American Dredging Company for a hydraulic dredge 110 feet by 31 feet 10 inches by ten feet.

Prince Rupert Drydocks & Shipyards, Prince Rupert, B. C., will build a 40-foot wooden cruiser for the Province of British Columbia, to be powered with 150 horsepower Scandia gas engine.

Ballard Marine Railway Company, Seattle, have a contract from Olaf Swenson & Company for a shallow draft tunnel type boat for river use. The boat will be 27 feet long and equipped with a 30-horsepower gas engine. Two scows 34 feet long by 12 feet beam have also been ordered by this company.

Ballard Marine Railway Co., also has an order from Captain Dunlap of the Johnson Tugboat Co., LaConnor, Wn., for a 60-horsepower tugboat to be powered with Fairbanks-Morse diesel engines. The boat will be 23 feet 6 inches long, 13 feet 6 inches beam, and 7 feet molded depth.

KEEL LAYINGS.

Associates, diesel-electric tank barge for Associated Oil Co. by Bethlehem Shipbuilding Corp., Union Plant, June 15.

Six diesel-electric vehicular ferryboats for Electric Ferries, Inc., by American Brown-Boveri Electric Corp., during June.

Barge for U. S. Engineers, Savannah, Ga., by Bethlehem Shipbuilding Corp., Harlan Plant, June 21.

Two steel carfloats for Pennsylvania R. R. by Wm. Cramp & Sons Ship & Engine Building Co., June 4 and 28.

Gulfpride, tanker for Gulf Refining Co., by Federal Shipbuilding & Drydock Co., June 15.

Meitowax, tugboat for Long Island Railroad Co. by Staten Island Shipbuilding Co., June 16; barge for National Lead Co., June 12.

Patsey Barrett, steam towboat for Barrett Line, Cincinnati, by Howard Shipyards & Dock Company, June 23.

LAUNCHINGS.

Steel carfloat for Atchison, Topeka & Santa Fe R. R. by The Moore Dry Dock Co., June 29.

Willetts Point, seagoing diesel-electric hopper dredge for U. S. Army Engineers by Federal Shipbuilding & Drydock Co., June 26.

Two steel deck barges for State of New York by Midland Barge Co., during June.

Glenmohr, single deck freighter for Great Lakes Transportation Co., Ltd., by Midland Shipbuilding Co., Ltd., Midland, Ontario, June 23.

Fairfax, combination passenger and freight steamer for Merchants & Miners Transportation Co., Baltimore, June 12.

Dan Hardie, steel hull ferryboat for Peninsula Terminal Co. by Spedden Shipbuilding Co., July 1.

Steel barge for Kelly Axe & Tool Co., by Chas Ward Engineering Works, July 1.

Geo. W. Miller, steam ferryboat for Vicksburg & Delta Ferry Co., Vicksburg, Miss., by Howard Shipyards & Dock Co., July 3.

DELIVERIES.

Golden State, diesel-electric ferryboat to Golden Gate Ferry Company by General Engineering & Drydock Co., June 27.

Oil tow barge to Associated Oil Co. by Los Angeles Shipbuilding & Drydock Corp., June 29; tow barge to Star & Crescent Co., San Diego, June 27.

Ten steel coal barges to Hillman Transportation Co., by American Bridge Co.

Dredge hull to Bneyons Co. by American Brown-Boveri Electric Corp., June.

Port Houston, fireboat to City of Houston, Texas by Bethlehem Shipbuilding Corp., Harlan Plant, June 15.

Philadelphia, ferryboat to Philadelphia & Reading R. R. Co., by Bethlehem Shipbuilding Corp., Harlan Plant, June 3.

WM. CORNFOOT, President GEO. RODGERS, Sec'y-Treas.

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In Atlantic Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairing

Palmetto, diesel double-ended ferryboat to Cooper River Ferry Commission, Charleston, S. C., by Charleston Dry Dock & Machinery Co., July 7.

Agoming, auto and passenger ferryboat to International Transit Company by Collingwood Shipbuilding Co., June 24.

Lighter to Wm. Spencer by Federal Shipbuilding & Drydock Co., June 28.

Dump scow to Great Lakes Dredge & Dock Co., by Great Lakes Engineering Works, June 23; floating dock to Ford Motor Co., June 5.

Barge by Nashville Bridge Co., June 1.

Josephine, diesel yacht to E. S. Burke, Jr., Newport News Shipbuilding & Drydock Co., June 19.

Aras, diesel engine yacht for Hugh J. Chisholm by Newport News Shipbuilding & Drydock Co., June 11.

Barge for Sun Oil Co. by Sun Shipbuilding Co., July 7.

Gouverneur, diesel - electric towboat for U. S. Engineers, St. Louis, by Howard Shipyards & Dock Company, Jeffersonville, Ind., June 17; maneuver hull for Vicksburg Engineers, June 10; concrete mixer hull for Vicksburg Engineers, June 10.

Charleston, diesel ferryboat for Tri-State Ferry Co., Cairo, Ill., by Howard Shipyards and Dock Co., July 1.

REPAIR AWARDS.

Bethlehem Shipbuilding Corporation, San Francisco, was awarded contract for damage repairs to the Associated Oil tanker Paul Shoup, which was extensively damaged by an explosion and fire while on drydock at the Bethlehem plant for cleaning and painting. Seven bids were submitted by Pacific Coast shipyards, with Bethlehem submitting low bid of $170,569 and 62 days.

The other bids were as follows:

Moore Dry Dock Company, $172,150 and 64 days;

Todd Dry Docks, Inc., Seattle, $179,000 and 72 days;

Los Angeles Shipbuilding & Drydock Corporation, $179,850 and 72 days;

Albina Marine Iron Works, Portland, $183,250 and 68 days;

Willamette Iron Works, Portland, $198,400 and 64 days.

Necessary damage repairs include removal and fairing or replacement of all of the forward end, forepeak, and No. 1 hold from the steel plates to the upper deck. Considerable damage on deck will also have to be repaired.

The Los Angeles Shipbuilding & Drydock Corporation have contract from the Union Oil Company's steamship Warwick for repairs to damaged stem.

Bethlehem Shipbuilding Corporation, San Francisco, was low bidder for general overhaul and reconditioning of the United States Army Transport Thomas, when bids were opened the latter part of June. Eight bids were submitted for the work including:

Bethlehem Shipbuilding Corp., $34,465;

Mare Island Navy Yard, $41,221;

General Engineering & Drydock Company, $41,562;

United Engineering Company, $41,607;

Moore Dry Dock Company, $42,035;

Thoe-Smith, $43,820;

Hanlon Dry Dock & Shipbuilding Co., $47,852;

Maine Iron Works, $49,863.

It is expected that the work will require about forty calendar days. The U. S. transport Thomas is one of the most famous of the government transports, operating out of San Francisco, and during the time the vessel is laid up another steamer will be placed on her schedule.

SHIPYARD NOTES.

The Prince Rupert Dry Dock & Shipyards, Prince Rupert, B. C., now has under construction a steel twin screw freight and passenger boat at Okanagan Lake for the Okanagan Lake Boat Company, Summerland, B. C. The boat is to be 127 feet long, 22 feet beam, and 6 feet 3 inches draft, and will be equipped with 2 210-horsepower Gardner diesel engines. Accommodations will be provided for 130 passengers and the boat will be of 100 tons deadweight.

Two scows built of spruce were completed and launched for the Skeena River Packing Company by this yard during June. They are 40 feet long, 14 feet beam, and 4 feet 2 inches depth.

The Marine Construction Company, Seattle, on July 2 launched the last of four big wooden barges for the Foss Company, Tacoma. Two of these barges were 130 feet long and 40 feet beam, and two were 100 feet long with 36 feet beam. The company does an extensive work in barge building for Puget Sound interests.

The Victoria Machinery Depot Company, Victoria, B. C. recently installed eight 8500-gallon oil tanks on the steamer Gray of the Consolidated Whaling Corp. This yard also instal-

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519 Robert Dollar Building
San Francisco

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led thirteen 8500-gallon tanks for handling oil cargo on board the steamer Princess Ena of the Canadian Pacific Railway Company. In addition to this latter job, the yard performed extensive repairs to the Princess Ena, making and fitting new propeller, renewing twenty plates, and other necessary repairs.

The Burrard Dry Dock Company, Ltd., North Vancouver, B. C., on July 1 launched the oil tank barge Marvolite for the Imperial Oil Company, Ltd. This barge is for British Columbia coastal deliveries and is 95 feet long, 7 feet deep, and 19 feet beam, with a capacity of 30,000 gallons of oil. She is powered with a Scandia semi-diesel engine and will have a speed of 8½ knots.

Twelve electric and twelve hand steering gears have been ordered from the American Engineering Company, Philadelphia, for installation on six diesel-electric automobile ferries now being built for Hudson River service

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BROWN-BOVERI EXPANSION.

The American Brown-Boveri Electric Corporation, New York City has formed a new department to design and build dredges in their entirety. Since it is obvious that a dredge is primarily a marine job, the company feels especially well equipped as it has organized the large plant and ways of the New York Shipbuilding Corporation (now American Brown-Boveri Electric Corporation) at Camden, New Jersey, to give this specialized service.

The designs and manufacturing rights of A. W. Robinson, Mem. Am. Soc. C. E., a specialist in the design and construction of dredges throughout the world, have been acquired and Lieut. Col. R. W. Berdeau, Assoc. Am. Soc. C. E. and Mem. Soc. Amer. Mil. Engrs., for many years with the dredging Division during the construction of the Panama Canal, has been placed in charge of the department.

Dredges, as a rule must be built under special plans, but many are susceptible to standardized designs and where possible such plant will be developed and resulting economy for the buyer obtained. Deviations, of course, will be made from these standards as required by the purchaser's special operating problem, but where standardized sizes can be used, the company recommends the 5, 7½, and 10 cubic yard types for the dipper dredges and the 16, 20, 24, and 30 inch sizes for suction dredges.

In addition, the Dredge and Harbor Department is prepared to furnish promptly smaller craft for harbor improvement as follows: drill boats, floating pile drivers, carfloats, pipe-line pontoons, barges, tugs, scows, ferryboats, and floating cranes. by the American Brown-Boveri Company, Camden, New Jersey.

The American Engineering Company also has received an order from the Newport News Shipbuilding Company for an electric windlass and electro-hydraulic steerer for the new coast guard cutter.

New Zealand Government is planning the construction of a motorship for interisland service. The vessel will be of 950 tons deadweight and will be used in carrying mails, cargo, and passengers between Western Samoa, American Samoa, Tokelau Islands, and northern islands of the Cook group.

RADIATORS ORDERED FOR MALOLO.

Wm. Cramp & Sons Ship & Engine Building Company have placed an order with Fowler & Wolfe Mfg. Co., Philadelphia, for approximately 800 steam radiators of various types and sizes for installation in the steamship Malolo, which is now building at this yard.

The steamer Newport, operated by the McCormick Steamship Company, was damaged June 29 to the extent of about $45,000. While on drydock for survey fire broke out and slight additional repairs will have to be made.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Associates, hull 5330, diesel tank barge for Associated Oil Company; 160 L.B.P.; 38 breadth; 9′6″ molded depth; 7′ molded draft; 4000 bbls. oil capacity; Union diesel engs.; **keel June 15/26.**

GENERAL ENGINEERING AND DRY-DOCK CO.,

Alameda, Calif.

Golden State, hull 1, double-ended diesel-electric ferryboat for Golden Gate Ferry Co.; 240′ over-all; 44′ molded beam; 17′ molded depth; Pacific Werkspoor diesel engs.; G.E. generators; keel Dec. 14/25; launched May 2/26; **delivered June 27/26.**

LOS ANGELES SHIPBUILDING & DRY DOCK CORP.,

San Pedro, Calif.

No name, hull 50, cabin cruiser for Don Lee; 140′ O.A.; 23′ 6″ beam; 9′ depth; 12.5 knots speed; 242 DWT.; diesel engs.

Hull 50, oil tow barge for Associated Oil Co.; 131 L.B.P.; 40 beam; 11 loaded draft; 7000 bbls. of oil capacity; keel Apr. 30/26; launched June 14/26; **delivered June 29/26.**

Hull 51, oil tow barge for stock, sold to Star & Crescent Co. of San Diego; 120 L.B.P.; 31 beam; 8 loaded draft; 3700 bbls. of oil capacity; keel May 15/26; launched June 23/26; **delivered June 27/26.**

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

D. L. Co. No. XLIX., hull 71, scow, 110x36x8′ 8″; keel Apr. 15/26; launch and deliver May 5/26 est.

Margnita, hull 74, mail, freight, and passenger boat for Coastwise Transportation Co., Juneau, Alaska; 90 L.B.P.; 22 beam; 15′6″ draft; 200 H.P. diesel engs. Keel Apr. 24/26; deliver June 24/26 est.

LAKE WASHINGTON SHIPYARDS

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Yacht for Frank Manz, 56′ long, 14′ beam; 6′ draft; 100 I.H.P. Hall-Scott eng.

Yacht for Wm. Trimshaw, 50′ long; 100 H.P. Eastern Std. eng.

THE MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

No name, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; keel May 3/26; launch Oct. 1/26 est.; deliver Dec. 1/26 est

No name, hull 171, sister to above; keel May 3/26; launch Oct. 15/26 est.; deliver Dec. 15/26 est

Hull 169, steel carfloat for Atchison, Topeka & Santa Fe R.R.; 260′ long; 38′ beam; 7′ draft; 620 D.W.T.; keel Apr. 1/26; **launched June 29/26.** deliver Aug. 31/26 est.

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi speed, 65-HP. gas engines.

ST. HELENS SHIP COMPANY,

St. Helens, Oregon.

Larch, tender for Lighthouse Dept.; 63′ long, 16′ width, 6′ hold; 100 H.P. Washington-Estep diesel engs.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 149′ 2″ x 33′ 4″x5′ 10-5/16″.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 170′ x 38′ 10″ x 6′ 1¾″.

Six steel barges for The Barrett Line, Cincinnati, 225′x40′x9′.

Two fueling scows for The Barrett Line, 100′x18′x8′.

Twenty (20) steel coal barges for Hillman Transportation Co.; 175x26x11 ft.; **10 delivered.**

Ten steel coal barges for Hillman Trans. Co., 175x26x11 ft.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

Hull 312, dredge hull, 140 ft long, for Bneyons Co.; keel Sept./25; **delivered June /26.**

Hull 314, suction dredge for U.S. Engineers; 130′ R.R.; 366′ long; 2 tracks; platform; keel Apr./26.

Hulls 315-318 inc.; 4 carfloats for N.Y. Central R.R.; 366′ long; 2 tracks; platform; keels (2) Apr. and (2) May/26; **1 delivered June/26;** 1 deliver July/26 est.

Hull 319, steel motor patrol boat for U.S. Coast Guard, Washington, D.C.; 125 L.O.A.; 23′6″ molded beam; 220 tons displacement; Winton diesel engs.;

Hull 320, sameas above.
Hull 321, same as above.
Hull 322, same as above.
Hull 323, same as above.
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Hull 346, same as above.
Hull 347, same as above.
Hull 348, same as above.
Hull 349, same as above.
Hull 350, same as above.
Hull 351, same as above.

Hull 352, diesel-electric vehicular ferryboat for Electric Ferries, Inc., New York; 155 L.O.A.; 48′6″ beam; 14′3″ depth; **keel June/26.**

Hull 353, same as above; **keel June/26.**
Hull 354, same as above; **keel June/26.**
Hull 355, same as above; **keel June/26.**
Hull 357, same as above; **keel June/26.**
Hull 358, same as above; **keel June/26.**

THE AMERICAN SHIP BUILDING COMPANY

Cleveland, Ohio.

Purchasing Agent: C. H. Hirsching.

Shipping Personals and Items of Interest

Admiral-Oriental Line—Fitting ceremonies were held at Seattle on June 15 when the steamship President Grant was delivered to the Admiral-Oriental Line by the Shipping Board, inaugurating the service of the five "535's" in private service of the Robert Dollar Company.

The Seattle Chamber of Commerce conducted the ceremonies, President J. W. Spangler presiding. Many prominent personages were present, including Mayor Bertha K. Landes of Seattle, Consul H. Kawamura of Japan, O. K. Davis, Secretary of the National Foreign Trade Council, New York, Col. Carmi A. Thompson, special representative to the Philippines, who embarked on the President Grant, Lew Kay of China, and Captain Robert Dollar, all of whom delivered speeches. Others present were Captain M. M. Jensen of the Grant, H. F. Alexander, president, and A. F. Haines, vice-president of the Pacific Steamship Company, Charles A. Wallace, counsel for the Admiral-Oriental Line, Frank W. Relyea, W. R. Fitch, admiralty counsel of the Shipping Board, J. L. Ekman of the Shipping Board, Charles E. Allen, district counsel of the Shipping Board for Washington and Oregon.

The Finkbine Lumber Company, of Jackson, Mississippi, is preparing to enter the intercoastal lumber carrying trade. J. W. Sommerville, vice-president and general manager of the Finkbine-Guild Lumber and Transportation Company, was recently in San Francisco and announced the award of a contract for the building of a lumber shipping terminal at California City (on San Francisco Bay) to be used for loading purposes only and to be one of the most modern of its kind on the Coast.

The Finkbine-Guild Company owns extensive lumber holdings at Rockport, and it is the plan of the company to bring this lumber to the California City terminal and load it on to the company's deep water carriers.

The company owns five steamers, all of which will be put into the trade as soon as possible. The vessels of the fleet have been operated in the intercoastal trade by the Munson Line, and it is indicated that some local steamship line will form a working agreement with the company for the handling of cargo to the Pacific Coast from the Atlantic seaboard.

McCormick Steamship Company.—Direct passenger service from Pacific Coast ports to the east coast of South America is the latest development in the expansion of the McCormick Steamship Company. The six freighters purchased recently by the McCormick company from the United States Shipping Board are to be remodeled and provided with passenger accommodations for the new service.

Hugh Gallagher, formerly operating manager of the Oceanic Steamship Company, who has been sent to Australia and New Zealand by the Matson Navigation Company to study shipping conditions and needs in the Antipodes

The fleet is composed of the steamships West Notus, West Mahwah, Hollywood, West Camargo, West Nilus, and West Cactus, and operate in the Pacific-Argentine-Brazil Line. They are to ply as combination passenger and cargo ships.

The vessels will call at the Pacific Coast ports of Seattle and others on Puget Sound, Portland and Columbia River ports, San Francisco and Los Angeles; thence via the Strait of Magellan and up the east coast of South America, calling at Bahia Blanca, Buenos Aires, Montevideo, and Santos, returning via the Panama Canal.

Pacific Steamship Company announced through H. F. Alexander, president, that **H. H. Fair** was elected a director of the company on June 18. Mr. Fair is vice-president of Peirce, Fair & Co., widely-known Pacific Coast bond dealers.

The board of directors of the Pacific Steamship Company now will consist of Mr. Alexander, M. A. Arnold, W. A. Broom, R. P. Butchart, Robert Dollar, R. Stanley Dollar, Herbert Fleishhacker, Mr. Fair, A. F. Haines, J. D. Hoge, D. C. Jackling, E. A. Stuart, Chester Thorne, David Whitcomb, and Mortimer Fleishhacker.

Suzuki & & Company, one of the largest of the Japanese shipping firms, moved their Pacific Coast headquarters from San Francisco to Seattle, effective July 15. R. Naka, formerly manager at Portland, will have charge of the Seattle office as Pacific Coast manager, succeeding S. Matsuo, who has been transferred from San Francisco to New York. Herbert E. Anderson, traffic manager of the company at San Francisco, will act in a similar capacity at Seattle. J. J. Moore & Co. will represent Suzuki & Company at San Francisco.

Another interesting facility has recently been put into operation at the **Howard Terminal, Oakland,** Calif., on its property at the foot of Market street, in Oakland. A modern fireproof warehouse has been constructed on the land directly adjoining one of the piers, by which arrangement it is possible to place in storage direct from vessels that merchandise so consigned, thereby eliminating the cost of drayage between dock and warehouse.

Y. R. Shields, formerly agent for the Los Angeles Dispatch Line at Los Angeles, has been appointed traveling freight agent for the **California & Eastern Steamship Company,** of Los Angeles, according to announcement from Thomas G. Widemeyre, general freight agent.

James Tyson, president of the **Charles Nelson Company,** of San Francisco, is in Washington negotiating with the Shipping Board for the purchase of seven freighters which are to be used in the coastwise and intercoastal lumber carrying trade.

The Nelson Steamship Company recently expanded their services between California and Washington ports and established a branch office at Tacoma, with H. L. McElhaney as chief and C. A. Cooper as assistant.

Captain S. Clark, formerly master of the tug Sea Salvor, has been appointed a surveyor for the San Francisco Board of Marine Underwriters He is to be stationed at Grays Harbor, where there was a vacancy owing to the transfer of Captain Clarkson to Vancouver.

Garland Line Changes—Neil S. Laidlaw has been appointed district manager of the Garland Steamship Corporation at San Francisco to replace E. N. Tormey, resigned. John Newton, who has been district freight agent for the Garland Line at Seattle, will succeed Mr. Laidlaw as Seattle district manager for the corporation.

Mr. Laidlaw opened the Seattle offices of the Garland Line when the General Steamship Corporation relinquished the Garland agencies in Seattle and Portland December 1 last year. He previously was connected with the Seattle district offices of the shipping firm of Swayne & Hoyt. Mr. Laidlaw formerly was in the Orient, where he held the position of assistant manager of the Kobe offices of the Pacific Steamship Company, the Admiral Line, under E. E. Johnson. He left the Admiral Line in 1922 to join the firm of Nickel & Lyons, Ltd., a firm engaged in lighterage and other shipping activities in the Orient. Mr. Laidlaw was manager of the American department of Nickel & Lyons in Kobe.

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Coastwise
Fleet

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and
Passenger

Coast
to
Coast

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A national organization operating 73 vessels Coastwise and Intercoastal provides the shipper of goods with a thoroughly dependable service. For the lumber trade, the mill has been brought to the market through the medium of this transportation system. McCormick lumber distribution is world wide.

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COAST TO COAST
SERVICE SINCE 1855

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EASTBOUND FIVE DAY SAILINGS WESTBOUND
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SAN FRANCISCO, LOS ANGELES—NEW YORK, PHILADELPHIA and BOSTON

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AMERICAN-HAWAIIAN STEAMSHIP COMPANY
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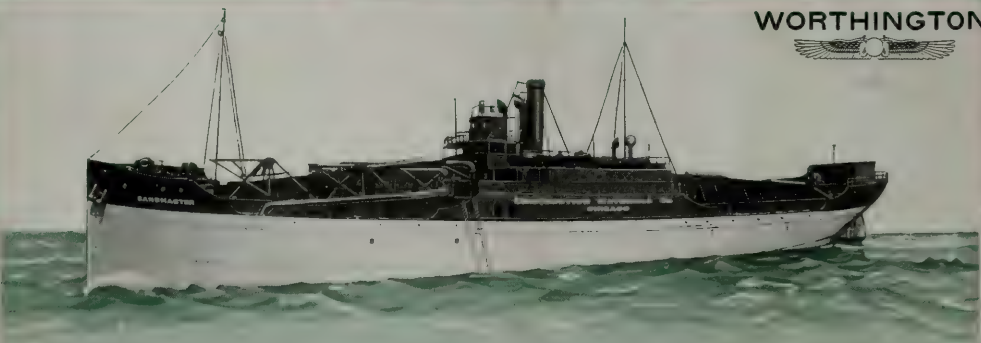
215 MARKET ST. SAN FRANCISCO CALIFORNIA

Pacific Marine Review

The National Magazine of Shipping

September, 1926



WORTHINGTON

The M. S. "Sandmaster"

First Commercial Diesel-Electric Seagoing Hopper Dredge Built in the United States

is Worthington equipped

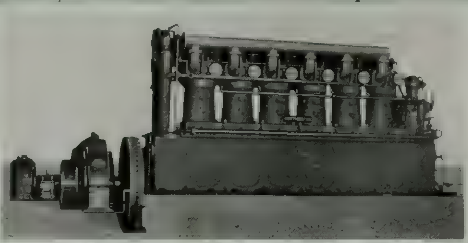
THE Construction Materials Company, Chicago, Illinois, the country's largest producers of sand, has recently placed in service the twin-screw hopper dredge "Sandmaster."

Two 600-hp. Worthington Diesel Engines direct connected to electric generators furnish the power for driving the propelling motors, auxiliaries and the huge sand pumps used for loading and unloading. Both the propellers and sand pumps can be operated either from the engine room or the pilot house direct at will.

A smaller Worthington Diesel-electric generator set is provided to take care of the port power requirements of the vessel.

The sand pumps are arranged to operate economically over a wide range of working conditions.

By using Diesel-electric power the owners anticipate better co-ordination of work between the crew on shore and on the vessel, a material reduction in the crew required and a substantial saving in fuel. In addition greater economy is expected through the elimination of delays in starting and stopping, getting under way, fueling and in making adjustments. Owners and operators will naturally follow the performance of his vessel with interest.



One of the Worthington 600-hp., 200 r. p. m., four-cycle, single-acting air-injection Diesel engines supplied for M. S. "Sandmaster."

7668-5

WORTHINGTON PUMP AND MACHINERY CORPORATION, 115 BROADWAY NEW CITY BRANCH OFFICES IN 24 CITIES

Official Organ

Official Organ
SHIPOWNERS' ASSOCIATION

Pacific Marine Review, Vol. 23, No. 9, Published Monthly at San Fancisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

The Oxygen Factor in Engineering Design

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Linde oxygen has played a major part in this striking development and logically has become industry's standard for the welding and cutting of metals.

Hand in hand with this development has gone Linde Process Service. Through its booklets and magazines, through its research laboratories, engineers and field service men, Linde Service has not only advanced oxy-acetylene technology, but has focussed these advances for the benefit of the Linde user.

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Producers of helium for scientific purposes

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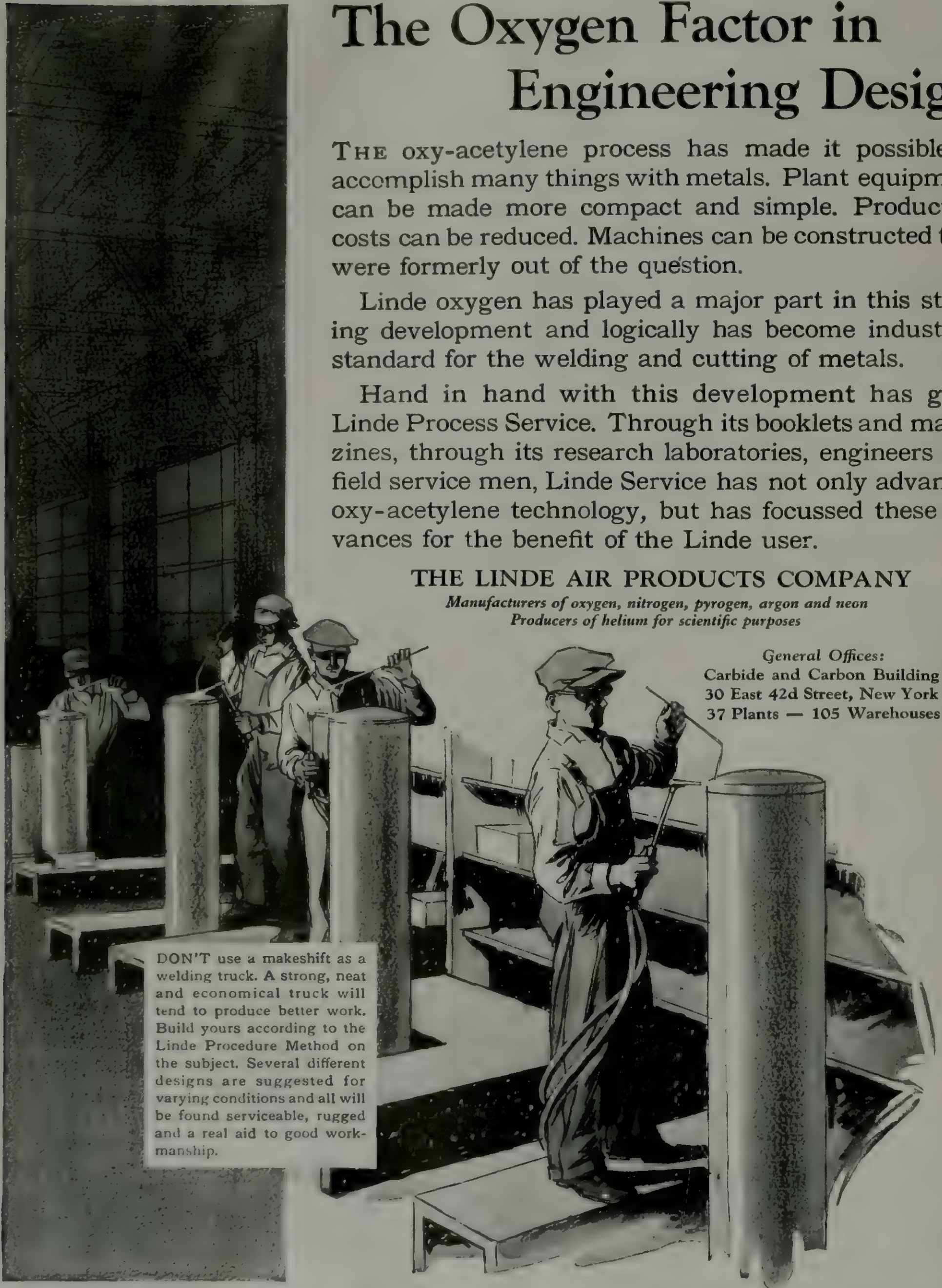

DON'T use a makeshift as a welding truck. A strong, neat and economical truck will tend to produce better work. Build yours according to the Linde Procedure Method on the subject. Several different designs are suggested for varying conditions and all will be found serviceable, rugged and a real aid to good workmanship.

LINDE OXYGEN

Pacific Marine Review

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PACIFIC OCEAN SHIPPING

MOTORSHIP INSTALLATIONS BY THE CRAMP COMPANY

WM. PENN 17100 Tons Displ.—4500 I. H. P.—11 Knots
CALIFORNIAN 16500 Tons Displ.—4500 I.H.P.—12 Knots
MISSOURIAN 16500 Tons Displ.—4500 I.H.P.—12 Knots
SEEKONK 11440 Tons Displ.—2300 I.H.P.—10¼ Knots

THE SEEKONK IS SUCCESSFULLY OPERATED BY UNITED AMERICAN LINES (Harriman Lines)

MOTORSHIP SEEKONK

ONE OF THE HOG ISLAND "A" BOATS, CONVERTED FROM STEAM TO DIESEL DRIVE, USING 6-CYLINDER, 4-CYCLE B. & W. LONG STROKE, SINGLE SCREW ENGINE, INSTALLED IN THE ORIGINAL MACHINERY COMPARTMENT OF THE STEAMER.

COMPARISON OF THE SEEKONK'S PERFORMANCE, IN SERVICE, WITH THE AVERAGE OF SEVERAL OF HER STEAM DRIVE SISTER SHIPS, SHOWS THE FOLLOWING RESULTS:

ONE FOURTH

THE FUEL CONSUMPTION OF THE STEAMERS, AT ONE-QUARTER KNOT HIGHER AVERAGE SPEED.

ONE TENTH

THE FUEL CONSUMPTION IN PORT OF THE STEAMERS.

MEANS OF FIRST THREE VOYAGES OF 41,000 MILES

I.H.P. MAIN ENGINE, 2237 R.P.M., 85.8; SPEED	10.23 Knots
CONSUMPTION PER DAY AT SEA MAIN & AUXILIARY ENGINES	7.41 Tons
CONSUMPTION PER DAY IN PORT	0.70 Tons
CONSUMPTION PER I.H.P. MAIN AND AUXILIARY ENGINES	0.298 Lbs.
KNOTS PER TON OF FUEL	32.70

Under the Burmeister & Wain System there were up to June 1, 1926, put into actual service 253 Motorships totalling 1,380,823 Gross Tons and 812,995 I.H.P.

No engine built to this system has ever been removed or replaced.

The Wm. Cramp & Sons S. & E. Bldg. Co.
PHILADELPHIA, PA., U. S. A.

BUILDERS OF COMPLETE MOTORSHIPS TO ONE STANDARD OF WORKMANSHIP AND ONE GUARANTEE OF PERFORMANCE (BURMEISTER & WAIN SYSTEM)

September, 1926 Vol. XXIII. No. 9

Pacific Marine Review

The National Magazine of Shipping

Official Organ Pacific American Steamship Association

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Official Organ Shipowners' Association of the Pacific

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S Hines
Published on the 25th of each month preceding the publication date.
Advertising and editorial forms close on the 15th.
Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie Editor.

Paul Faulkner, Advertising Manager

A Much Needed Association

MODERN trade practice almost demands a measure of cooperation among the various units that together compose any particular branch of our industrial life. This demand has brought into being many useful trade associations which enable the several industries represented to present a united front for the carrying on of any desirable propaganda, the passage of any beneficial or prevention of any harmful legislation, and the encouragement of good business ethics and suitable standards of mechanical practice and design. There is hardly a line of industry or manufacture which is not covered in America and in other countries by such an association.

This being the case it is rather surprising that the internal combustion engine manufacturers of America are not yet organized in this way. Great Britain has a strong Diesel Engine Manufacturers Association and an equally strong Diesel Engine Users Association. Both of these bodies function in research and in the gathering of operating data, in advertising propaganda for the education of the British shipowners and captains of industry on the subject of diesel economy, and in formulating standard specifications for diesel engine installations and diesel engine tests.

Such an association of diesel engine builders in America could regulate the industry so as to do away with the destructive knocking of competitors now so much in evidence whenever a job is in sight. It could prevent the insertion of "liquidated damages" clauses such as recently appeared in the specifications for a Pacific Coast marine installation. It could function as a source of reliable information on diesel engines for consulting engineers and operating managers. It could furnish the daily press and technical journals with dependable copy on diesel engine performance alfoat and ashore. It could act as a clearing house for interchange of ideas between manufacturers and gradually standardize motor room installation practice.

All this could be done with no interference to healthy competition and with much benefit to the builder and the user of diesels. Let's have an Association of Diesel Engine Builders of America and "put across" some constructive propaganda for the more universal use in America of the world's most economical prime mover.

Intercoastal Rate Regulation

FOR some time past an increasingly warm debate on rate regulation has occupied the center of the stage with intercoastal operators. The conference rates are occasionally set aside by some one or more operators on some one or more commodities and then the conference may discipline the offenders or may declare the rate on such commodities as "open." If the latter course is taken the debate on regulation immediately gets warmer and at times almost becomes hot.

Some operators think that the Shipping Board should function on regulating intercoastal rates in the same way that the Interstate Commerce Commission does with the railroads. Others think that the Conference of private owners should monopolize the privilege. Still others think open competition without conference regulations is better for all concerned. It depends entirely on the point of view, and the points of view of American shipowners, even when they are operating vessels engaged in the same trades and on the same routes, may differ very widely.

Of one thing we may be sure. The trend of modern business in all lines is increasingly toward regulation. As Herbert Hoover puts it, "The American business man in all lines faces regulation. In some lines he may still have the privilege of self-regulation, but if he does not soon avail himself of that privilege government will take it away and do the regulating for him."

Facing that situation, it behooves American shipowners to solve the basic problem of self regulation and come to an agreement among themselves on rate and other questions so that they may take united, harmonious action in their contracts with all American movements affecting shipping.

The American Spirit

IN the good old clipper ship days many an American boy scarcely out of his teens won fame and renown in the ports of the world as an officer of one of the famous white-winged flyers. In those days it was not uncommon to see captains not yet out of their twenties in full command of the finest ships afloat. Such was the American spirit a hundred years ago and that spirit is as much alive today as it was then.

Not so often now as then, however, is the American spirit directed toward the sea, and so we acclaim the unusual achievements in that direction of Charles Saunders of San Francisco.

This young man, now serving as 2nd mate on the steamer Ventura, received his master's certificate on July 15 last, a month before his twenty-sixth birthday. Captain "Charley" Saunders, a fine upstanding, healthy specimen of American youth, is an excellent navigator and a good executive with considerable experience at sea already entered on his log. Incidentally "Charley" is the son of Captain Chas. W. Saunders, operating manager of the Matson Navigation Company.

Broadcasting Goodwill

THE "Knights of the Mike" often tell of the thrill that is theirs when some far away "listener-in" writes the station to tell of receiving and using some bit of information and of benefits accruing therefrom. Less frequently, and perhaps for that very reason with greater force, the editor of a trade journal experiences such a thrill when some distant reader loosens up and becomes confidential. An illustration of this arrived very recently in a letter from a subscriber at Apia, Samoa, from which we quote the following excerpt:

"Here is an incident that may interest you, as to where your paper travels to and how carefully it is read.

In 1924 you published an account and plans of Mr. Keith Spaulding's yacht, Goodwill. I had been island manager on Nassau Island for five years, never left the place. When Mr. Spaulding was cruising in the South Pacific in June, 1925, he was asked by the Administrator of Western Samoa to keep a lookout for the crew of the schooner Samoa, which was wrecked on my island.

I identified the Goodwill about three miles away and when Mr. Spaulding was told by the Commissioner of the Ellice Islands, he was that pleased he wanted to see the paper that gave such a good description of his yacht, that she could be identified by a stranger.

Faithfully yours, F. Lawrence McFall."

* * *

Another thrill slightly less spectacular but none the less appreciated arrived from New York City by the next mail as follows:

"Your recent number with the article on qualities and calculations of ships (The Physical Aspects of a Vessel) by Norman F. Titus, presents therewith to the naval architect a most gratifying outlook. If the representatives of shipping firms and insurance companies make so deeply and interestedly a study of these questions the actual experiments and calculations will rapidly visualize in concrete form, as the various conditions of loading and immersion occur in actual operation.

"There is little doubt that practical commercial methods can quickly be evolved that would allow these practical experiments and secure very valuable data at a very limited expenditure of time and money, which should and would never be a deterrent from energetically searching for full and clear results.

"The outline of the article by Mr. Titus sets forth excellently a good idea of the comprehensive judgment that a full set of calculations can give upon the qualities of the ship. A comprehensive judgment that will assuredly have a far reaching bearing on her mechanical and commercial career." Theodore Lucas, Member, Society Naval Architects and Marine Engineers.

* * *

Another voice from New York declares: "I have been very much interested in reading the article under the caption, 'The Purchasing Department of a Modern Steamship Company,' written by Mr. Hobart W. Mears, Purchasing Agent, Matson Navigation Company.

"There, certainly, is a real purchasing agent, and if we had more purchasing agents that took his view or people of his standing who would write these articles, it would show the penny-wise and pound-foolish buyers that the saving of a penny and the losing of a dollar is poor purchasing. I think Mr. Mears' remarks under the caption of 'Paint Specifications,' hit the nail squarely on the head. That does not only apply to paint; it applies to everything—whether it be in steamships, railroads, house building, or what.

"I was director of purchases for many years of a big manufacturing concern and saw the error of trying to save a penny on the first cost, to lose a dollar on the final. Now being on the other side, I am able to see both angles and it is refreshing to read constructive articles such as Mr. Mears has written in the August issue of the 'Pacific Marine Review.' His remarks are so in accord with all good business judgment that I cannot resist the temptation to write you and show my appreciation of such constructive thought."

Another Rotor Motorship

IN Germany the "Magnus effect" will not down. The latest experimental vessel is the Barbara, built at the Weser yard in Bremen by the German Admiralty to test out Fettner rotors as an auxiliary source of power, and just how on a commercial voyage under charter to Robert M. Sloman, Jr. of Hamburg in their Mediterranean service.

The Barbara is 295 feet in over-all length, 48.3 feet molded beam, and 19 feet molded depth, with a loaded draft of 17.7 feet and a deadweight capacity of 2800 tons. She is fitted with two 6-cylinder, single-acting, 4-cycle diesel engines, each generating 500 brake horsepower at 300 revolutions a minute, their power being transmitted through Vulcan hydro-mechanical gearing to a single propeller shaft running at 80 revolutions per minute. This arrangement drives the vessel at 10 knots per hour. Two diesel engine generating sets of 100 horsepower each are installed in the engine room and furnish power for the rotors, for lighting, and auxiliary machinery.

The Barbara is equipped with three Fettner rotors. These are cylindrical 59 feet in height and 13.1 feet in diameter. They are very carefully built of a new aluminum alloy called Lanta metal, which is said to combine the strength of steel with the lightness of aluminum. The shell is of sheets 1/32-inch in thickness fitted on a cylindrical frame work. Each rotor weighs 3100 pounds. They are hung on ball bearings on a steel pivot and driven by electric motors through helical gearing. The speed and direction of rotation of the rotors is controlled from the pilot house through a carefully worked out system of connections, safety devices, and controls.

On trial the Barbara showed some very interesting results. With propellers disengaged and with a wind at 105 degrees off center line of ship and of No. 4 Beaufort velocity, a speed of 5.5 knots was obtained with 75 horsepower consumed in turning the rotors 140 revolutions a minute. With the same wind at 150 degrees of the center line, so that it came from 30 per cent of dead aft, and other conditions equal, a speed of 5.5 knots was obtained with 45 horsepower expended on revolving rotors.

With one engine working, 7 knots was obtained and with the wind as above coming from a little aft of thwartships, 45 horsepower on the rotors brought this up to 9.5 knots. With both engines operating to give 9 knots, 45 horsepower on rotors increased the speed to 10.5.

Bridging San Francisco Bay

SAN FRANCISCO is very much exercised just now over the idea of building a bridge across the Bay to Oakland. Attention is being focused on this project through the holding of extensive hearings by the Board of Supervisors to determine just what shall be done with the many applications for bridge franchises now before that body.

The United States Engineers have laid down certain rules concerning the location and design of San Francisco Bay bridges, and only a small minority of the plans now before the supervisors comply with these rules. Those that do comply with the rules do not appeal very greatly to San Francisco supervisors.

Meanwhile the transportation of commuters and automobiles across San Francisco Bay is increasing rapidly and is being taken care of by the ferry services in a very efficient and economical manner. These services compare favorably with any in the world and are surpassed by none. This being so, there would seem to be no great need for haste in deciding about a bridge or bridges, and there would seem to be justification for taking ample time to consider the question "To whom shall we grant franchises for a bridge or bridges."

To any one familiar with San Francisco Bay, the great strategic point which looms on the horizon of trans-bay transportation problems is Goat Island. It makes no difference whether we consider improved ferry service or bridge as the final solution, Goat Island is the logical East Bay terminal. Here is an almost made-to-order bridge abutment, or an ideal site for a union ferry and railroad terminal and adjacent thereto an immense area in tidal flats suitable for industrial sites. The west front of Goat Island is slightly more than 1¼ miles from the San Francisco pier head line. The east side of Goat Island is about that same distance from the end of the Southern Pacific pier and from the projected pier head line of the outer harbor development of Oakland. North of Goat Island a silt shoal about ½ mile wide projects up the bay for over a mile. Between this shoal and the tidal flats of the East Bay shore is a channel with 18 feet of water at mean low tide. This deepens east of the island to about 50 feet (with one pocket of 16 fathoms) and shoals again to 30 feet at the south end.

It is an easy and practical engineering proposition to build any required number of elevated tracks and highways from Goat Island directly to the various centers of population on the east and north sides of San Francisco Bay. The island and its shoal afford ample area for terminals adequate to take care of the trans-bay business in any conceivable ratio of expansion. The tidal flats afford almost unlimited opportunity for industrial sites, with deep water and rail-connection. By the very simple and economical process of hydraulic dredge and fill, this waste area can be converted into another waterfront like that of San Francisco. The fact that it is now waste will enable intelligent planning to open every part of this area to deep water canals and at the same time cover it with interurban rapid transit and trans-continental rail connection.

This is the sensible next step in trans-bay transportation. More man hours could be saved for commuters by changing the East Bay terminal of the ferry system to Goat Island than by any bridge at any other point. The development of such a terminal at Goat Island would cost far less than any of the proposed bridges and would be paid for many times over by the increase in value of the tidal flats.

Therefore, before any bridge is decided upon, the Navy Department, which now controls Goat Island, the Board of State Harbor Commissioners, and the municipalities on both sides of San Francisco Bay should get together on a policy for the release of Goat Island and the development of its shoals in the interests of public commercial welfare. With such a policy established and a building on the island similar to the one now serving the San Francisco end of the trans-bay ferry system, the present floating equipment would make the crossing in approximately 8 minutes, and with adequate trackage and highway systems across the tidal flats the present train schedules could be considerably reduced.

Later, when conditions demand the investment, high level bridges and tubes from Telegraph Hill to Goat Island would be the ultimate solution.

The key to future developments in trans-bay transportation is the control of Goat Island and its tributary shoals and tidal flats.

* * *

First Bracketless Tanker

THE first tanker built on the new Isherwood "Bracketless-System" is now on her initial voyage from Great Britain to the Far East. This vessel named the British Inventor in honor of the patentee of the System, was built by Palmers Shipbuilding and Iron Co. at Jarrow & Hebburn on Tyne, for the British Tankers, Ltd. of London. Her dimensions are: length 430'0"; beam 58'0"; depth molded 34'3". She has a dead weight capacity of 10,000 tons on 26'6" draft and is classed 100 A1 at Lloyd's. She is of the ordinary tanker arrangement with machinery aft and with nine double main cargo tanks and the regulation summer tanks in the 'tween deck spaces. Oil fuel is carried in a cross ship bunker and in double bottoms under the boilers and in deep tanks forward. The cargo pump room is amidship and the silhouette of the vessel is on the modified three island type with a long poop aft and short bridge and forecastle, these three superstructures covering about 40% of her length.

The machinery is the regulation British triple expansion steam plant with three oil burning Scotch boilers generating steam at 180 pounds pressure.

The British Inventor was put through severe maneuvering and speed trials fully loaded. On these trials, she averaged eleven knots, which is a good speed for a vessel of this size and engine power. The most remarkable feature on the trials was the practical elimination of vibration even when going full speed astern. Careful deflection measurements were taken during the trial and these are claimed to have shown less deflection than ever before attained in a similar tanker. One dry tank critically examined after the trial was found to be in perfect condition. The trials demonstrated in every way that the "Bracketless-System" has shown in practice what the naval architects considered might be expected.

Marriages at Sea

ANOTHER sea tradition has received a rude shock at the hands of the United States Shipping Board. The masters on Shipping Board vessels are now forbidden to perform the marriage ceremony. Surely if long established custom ever creates legal authority the ship-master at sea is defacto a Justice of the Peace. However the learned General Counsel for the Shipping Board holds otherwise and apparently he has some weighty authority back of his decision. Much unnecessary confusion has been caused by press comment on this matter and the full text of the decision will therefore be of interest. It is understood that the Shipping Board is expecting an opinion from even higher legal authority before finally disposing of this matter.

The master has, by virtue of his office, broad and extensive powers when his vessel is on the high seas. These powers are given to him by the admiralty and maritime law. This law, however, has never been extended to cover marriages either by court decisions or by Congressional legislation. Congress has not attempted to legislate generally on the subject of marriage except in the District of Columbia and territories subject to its exclusive jurisdiction. There is no Congressional legislation in reference to marriages performed on the high seas. The only acts dealing with the subject of marriages outside of the territorial jurisdiction of the United States are Sections 4082 and 4083 of the Revised Statutes, which authorize United States Consuls and United States Ministers to perform marriage ceremonies in foreign countries. Within the United States (except for the District of Columbia) the subject of marriage has been left exclusively to the states.

As to matters not covered by the admiralty and maritime law, a vessel when on the high seas carries with her the law of the state in which is located her port of documentation (Norman v. Norman, 121 Calif. 620; Crane v. Kelly, 16 Wall 610). Whatever authority a master may have to perform a marriage ceremony must be derived from the law of the state in which the port of documentation is located. The several states by statutes, have authorized certain classes of persons to perform marriage ceremonies. As far as we can ascertain, no state has ever designated a master of a merchant ship as one who may exercise such authority.

The question of the authority of the master to perform a marriage ceremony was involved in the case of Norman v. Norman, 121 Calif. 620. There a marriage ceremony was performed by the master of a vessel documented at a California port. At the time the ceremony was performed the vessel was outside the three mile limit. The Court said:

> "There was no solemnization by any person authorized by law to perform the ceremony."

The marriage in the Norman case was invalid for other reasons. That case also holds that a marriage ceremony performed on a vessel documented at a California port is invalid unless authorized by the laws of California and performed in accordance with the requirements of its laws. The case has been frequently cited by text writers with approval.

It is interesting to note that Section 2048 of the U. S. Navy Regulations & Naval Instructions provides:

> "The commanding officer of a ship shall not perform a marriage ceremony on board; nor shall he permit one to be performed when the ship is outside the territory of the United States, except in accordance with the local laws and laws of the State, Territory, or district in which the parties are domiciled, and in presence of a minister or consul of the United States, who consented to issue the certificates and make the returns required by the consular regulations."

It is provided in Section 4290 of the Revised Statutes that the master shall enter in the log book "every marriage taking place on board, with the names and ages of the parties."

This is merely a requirement for the entry in the log book of marriages which take place, and is not in any sense a grant of authority to the master to perform marriage ceremonies.

The British Merchant Shipping Act contains the same requirement that a master shall enter in the official log book "every marriage which takes place on board, with the date thereof and the names and ages of the parties."

There are, apparently, no decisions of the English courts dealing with the authority of the master of a merchant vessel to perform marriage ceremonies.

William P. Eversley states, in The Law of Domestic Relations 2d Edition, page 110:

> "There is no judicial decision which has recognized, or statute which validates, a marriage celebrated on board of any British merchant ship; but the Merchant Shipping Act, 1854, provides for the entry by the master in the official log book of any marriage taking place on the vessel. If both parties were British subjects, and were married by a minister in recognized orders, the marriage would probably be upheld.........."

Browne & Fowles' Law and Practice in Divorce and Matrimonial Causes contains the following statement at page 202:

> "Marriages on board merchant ships.—There is a further class of marriages on board ships, for proof of which provision has been made by the Merchant Shipping Act, 1854. It is proved (i. e. provided) by section 282 of that Act that every master of a merchant ship shall enter in the official log book of the vessel every marriage taking place on board his vessel, with the names and ages of the parties. There is, however, no statutory authority for the solemnization of any such marriage on board a British merchant ship, nor has any statute ever been passed to give retroactive effect to any such marriage; and where the captain performed the ceremony its validity might certainly be challenged.
>
> Indeed it is difficult to see, after the decision of the House of Lords in Reg. v. Millis (10 Cl. a F. 534) whence the legality of such a ceremony of marriage could be derived under English (as distinguished from Scotch) law."

It seems clear, therefore, that the master of a merchant vessel of the United States has no authority to perform a marriage ceremony. No opinion is expressed, however, on the validity of the marriages which has been performed by such masters. These may be valid as common law marriages under the laws of the states in which the vessels were documented at the time.

American Ship Seminole

By F. C. Matthews.

The ship Seminole at a San Francisco wharf in the late seventies.

THE Seminole was generally called a half clipper, having fairly sharp lines yet able to carry in heavy cargo, about 50 per cent over her original register, 1511 tons. She was 196:5 by 41:6 by 25 feet and was built of hardwood at Mystic, Connecticut, by Maxon Fish & Co., in 1865; launched July 11. Her cost was $143,500 currency and she classed A1 for ten years in American Lloyds. A nearly upright stem, ornamented with a finely carved Indian warrior and a well graduated lively sheer showed her to advantage from a broadside view; but her surrounded stern was criticized as being rather heavy. She was well sparred and neat and handy aloft.

Her original owners were Lawrence Giles & Co. of New York and George Howes & Co. of San Francisco, and for the first twenty years of her sea life she was operated as a regular trader between New York and San Francisco, being one of the most popular ships on the run. Her first master was Captain Joseph Warren Holmes, well known in connection with his prior Warren Holmes, well known in connection with his prior commands, the Elizabeth F. Willets, Haze, and Twilight, also engaged in the Cape Horn trade. Captain Holmes made 19 voyages in the Seminole, leaving her in 1887 to take the Charmer, III. After having rounded Cape Horn 84 times, and the Cape of Good Hope 14 times, the captain retired from the sea in 1902 and passed away at his home in Mystic in November 1912, age 96 years.

The Seminole made 21 passages from New York to San Francisco, on one of which, that in 1868, she was dismasted in the Gulf Stream and was over three months undergoing repairs at St. Thomas. The average of her other 20 runs is 126 days against that of 124½ days for 20 runs made by the Black Hawk, a well known and popular contemporary. The fastest run made by the Seminole was 98 days on her maiden voyage, and to offset this her longest was her last passage over the course, 155 days in 1887.

In 1884 the Seminole was 112 days; in 1876, 113 days; and in 1869, 114 days. She made 9 runs in between 120 and 130 days. Her second longest was in 1872, 143 days. Memoranda of her various passages show that in general she met with moderate and favorable winds, which, while not allowing any great days' runs to be made, yet enabled her to maintain consistently steady progress. It is noted that she was very fortunate in her experiences off Cape Horn, only 6 out of her 21 passages to the westward taking 20 days or over.

On her fastest, her maiden voyage, she left New York December 3, 1865, and arrived at San Francisco March 11, 1866; crossed the line 23 days out; was 22 days thence to 50 South; 14 days rounding the Horn, and 22 days running up the South Pacific to the equator, which was crossed on the 81st day out, this being her fastest time to that point. Her time of 17 days from the line to San Francisco was very good, and this run was again repeated in 1878 when her whole time on the passage was 123 days. Her average time from New York to the line is 30 days, with 21 days in 1867 as the shortest (full time on run, 120 days).

On her longest trip, in 1887, 155 days, the Seminole was 50 days to the line. From the line to latitude 50 South her average is 28 days; fastest 22 days on her maiden voyage; slowest, 35 days in 1886 (full time on run, 136 days). Average of rounding the Horn, 17 days; fastest, 8 days in 1876 (full time on run 113 days); slowest, 25 days in 1872 (full time on run 143 days). Average from 50 South, Pacific, to the equator, 25 days; fastest, 18 days in 1876 (full time on run, 113 days); slowest, 33 days in 1877 (full time on run, 126 days). Average from equator to San Francisco, 26 days; fastest, 17 days on two occasions, once on her maiden voyage and again in 1878; in 1873 she was 19 days, (full time on run, 131 days); slowest, 37 days, on her slowest run, 1887. Her fastest time from equator in Atlantic to equator in Pacific was 54 days in 1876, when her full time on the whole run was 113 days.

Homeward bound from San Francisco, the Seminole's record is good. She made 17 passages to New York, during one of which, in 1870-1871, she put into Valparaiso leaking, and was repaired by divers. The average of the other 16 runs is 108 days, there being 3 under 100 days; namely 94 days in 1883, 96 days in 1884, and 97 days in 1877; her longest were two of 119 days each. She made one run of 101 days to Queenstown and two of 116 and 112 days, respectively, to Liverpool.

(Continued on Page 398)

General Average

A Concise Statement of a Much Misunderstood Subject

**By Norman F. Titus, Manager, Claims-Insurance,
McCormick Steamship Company.**

IN ancient times it was customary for merchants to accompany their goods, and consequently when a severe storm arose and it became necessary to jettison, or throw overboard cargo, in order to lighten the ship and allow her to proceed with safety, one can well imagine the predicament of the master. Each owner would naturally insist that his goods be left intact and someone else's shipment be thrown overboard. From just such cases as this arose the definite principle promulgated in Rhodian law, that the one who suffered loss should be reimbursed by all who participated in the adventure. This general assessment became known as general average and was the forerunner of the law of today.

The present law is infinitely more complicated than the ancient Rhodian law covering jettison. For a long time a great deal of confusion existed due to the variation of the practice in different countries, but finally, after twenty years of patient effort on the part of the Maritime Law Committee of the International Bar Association, the York-Antwerp Rules of 1890 were passed and are now commonly accepted all over the world. Practically every bill of lading contains a clause providing that general average, if any, shall be adjusted according to the York-Antwerp Rules of 1890, or according to the revised rules known as the York-Antwerp Rules of 1924.

What Constitutes General Average: A general average is a loss which arises in consequence of a voluntary and successful sacrifice, under extraordinary circumstances, of part of the property included in a common maritime adventure, solely for the benefit of the adventure as a whole at a time of peril threatening physical injury to the whole, or through reasonable extraordinary expenditure for the common benefit of the whole adventure, occasioned by a voluntary act.

Who Contributes in General Average: Such loss is contributed to proportionately as the parties concerned are benefited.

An Illustration:

A ship valued at	$200,000
Cargo valued at	45,000
Freight amounting to	5,000
Value at risk	$250,000

In time or peril cargo at $22,000 was jettisoned and a general average assessment of 10 per cent was levied, thus producing $25,000, taking care of all claims and expenses and permitting a small amount to be returned to each contributor.

Method of Adjustment.

The adjustment is generally performed by an expert known as a general average adjuster, who is selected by the major interest, generally the shipowner. Adjustments are highly technical and sometimes take as long as three or four years for completion.

To give the right to claim for general average contribution there must be:

(1) An imminent or impending physical peril common to vessel and cargo.

(2) A voluntary sacrifice or reasonable extraordinary expenditure to avert such peril.

(3) A successful result.

(4) An absence of fault on the part of those claiming contribution.

Principal Types of General Average.

(1) **Jettison.** (This has already been described.)

(2) **Voluntary Stranding** of a vessel by her master to avoid a greater loss or damage to vessel and cargo by an impending peril common to both is a general average act.

(3) **Negligent Stranding.** If the stranding of a vessel occurs through negligent navigation of master, officers, crew, or pilot, no claim can be maintained by the shipowner against the cargo for contribution, unless there is something in the contract to the contrary. Practically every bill of lading contains the so-called Jason Clause, and this gives the shipowner the right to call upon the cargo owner for contribution.

(4) **Loss of Anchors and Chains.** If anchors and chains are voluntarily sacrificed at a time of peril for the common benefit, their value can be recovered in general average, provided they were not lost while being put to their customary use. The commonest illustration of this is the slipping of anchors and chains to avoid an approaching storm or an impending collision when it would have been unsafe for the vessel to remain at anchor.

(5) **Vessel's Fuel Supply Running Short.** If at the commencement of the voyage, the vessel has ample fuel and a reasonable surplus, and then through unforseen circumstances the voyage is prolonged and she is consequently put to extra expense or damage, these are made good in general average.

(6) **Breaking of Propeller, Shaft, etc.** It not infrequently happens that some accident to propeller, shafting, or other part of the machinery of a steamer results in disabling of the vessel, in consequence of which she is obliged for the common safety to put into, or to be towed into a port of refuge or to destination. In such cases, if the damage results from perils of the sea, the expenses incurred in getting into port and those that are the direct consequence thereof are the subject of general average contribution.

(7) **Mast, Spars, Sails, Rigging Cut Away. Excessive Use of Machinery.** Masts, spars, and other top hamper cut away to save the vessel and contents are recoverable in general average. Also expense incurred by the excessive use of machinery as, for instance, running the engines at full speed to get off a strand, are recoverable in general average.

(8) **Extinguishing a Fire on Board.** Fire-damaged goods are recoverable under the ordinary form of marine insurance policy. Damage done by water in extinguishing the fire is recoverable in general average.

(9) **Salvage Expenses** are apportioned in general average.

SALVAGE.

Salvage may be defined as a legal liability which is created by the rescue of maritime property from perils of the sea. From the standpoint of the owner of the property, it is the price of safety.

Salvor's Lien. Whoever performs a salvage service acquires for compensation a maritime lien of the highest rank upon the property saved.

Amount of Reward. Success is a prerequisite. Securing this, the amount of reward is determined by the following factors:

(1) The degree of danger from which the lives or property are rescued.

(2) The value of the property saved.

(3) The risk incurred by the salvors.

(4) The value of the salvor's property, and the risk to which it is exposed.

(5) The skill shown in rendering the service.

(6) The time and labor occupied.

(7) The degree of success achieved, and the proportions of value lost and saved.

As a general thing salvage is not allowed in an amount exceeding 50 per cent of the value of the thing salved, although there are cases where as high as 75 per cent has been allowed. There was an old rule "50 per cent for a derelict." It is the policy of the admiralty to stimulate efforts for the rescue of property in distress by liberal rewards, and also to discourage exorbitant demands and inequitable behavior by correspondingly reducing them.

Who May Be Salvors. Generally anyone not under obligation to render the service may rank as a salvor, and, conversely, those obliged to work cannot claim any reward; thus, sailors cannot be salvors while members of the crew.

Distribution of Salvage Award. The rule of the admiralty is that all who materially contribute to the rescue are entitled to share in the award. The courts frequently divide the amount between the owner and the crew, and apportion the share of the latter in proportion to their wages. The principal element in determining the owner's share is the value of the ship and the risk to which it was exposed.

Effective Fire Protection Regulations

By J. S. Jones,
Secretary of the Marine Committee of the American Institute of Electrical Engineers.

DETECTION and prevention of fire at sea, the most dreaded of all marine catastrophies, was first given official consideration when the American delegation to the International Conference on Safety of Life at Sea offered the following:

> Resolved: That the American delegation proposes the following principle for the consideration of this sub-committee, and requests its adoption and endorsement:
>
>> That the several states signatory to this conference agree to enact such legislation as will to the fullest possible extent provide for the prevention, detection and extinguishing of fire on shipboard, the details of the installation and application of such law to be regulated and arranged by the several signatory states.

Not until 1916 did the rules of the Department of Commerce, Steamboat Inspection Service, take official cognizance to this vital subject, when Rule IV, applying to ships under American Registry, of the present regulations was adopted and has remained in force without change up to the present. The progress made in the art of shipbuilding has long since caused this regulation to be inadequate to meet the present day requirements.

Rule IV, Section 14, of the General Rules and Regulations prescribed by the Board of Supervising Inspectors, states that:

> "All passenger vessels of more than 150 feet in length, whose construction is contracted for after June 30, 1916, which are provided with staterooms or other sleeping quarters for passengers, shall be equipped with an efficient fire alarm system or indicator which will automatically indicate or register, at one or more points or stations where it can be most quickly observed by the officers or crew of the vessel, the presence or indication of fire in the staterooms and various other compartments of the vessel which are not accessible to the observation of the officers or crew,............"

This rule, being very broad and capable of many interpretations, has resulted in a number of different types of fire detecting and alarm installations being made, some of which are of doubtful efficiency and effectiveness. This is evidenced from statistics compiled by the United States Coast Guard Section of the Treasury Department, which show that from July 1, 1921 to June 20, 1925 there were 701 vessels on fire, in which, besides the large loss of life, the property value involved was $69,793,950, and the loss by fire amounted to $25,169,770, representing approximately 36 per cent of the total value of the vessels and their cargo.

Needless to say such a tremendous loss of life and property has caused the Department of Commerce to give further consideration to the question of fire detection and protection of vessels under their cognizance, and at the last annual meeting of the Board of Supervising Inspectors, the question of automatic fire alarm detection and protection occupied a prominent place on the schedule of subjects under discussion. Not until the meeting of January 1926 was the subject gone into comprehensively, and as a result of this meeting the Steamboat Inspection Service have under contemplation a revision of Rule IV, Section 14, of their regulations. The following proposed change has been issued by this department for the comments of all interested and concerned in the question of fire detection and protection of ships:

> "All passenger steamers shall be equipped with an approved fire alarm system or indicator which will automatically indicate and register, at one or more points or stations where it can be most readily observed by the officers or crew of a vessel, the presence or indication of fire in staterooms, officers' and crew's quarters, cargo, and various other compartments of a vessel where fires are liable to occur."

This contemplated change, while more explicit as to the requirements than the previous regulations governing automatic fire alarm systems, more especially in respect to the compartments to be protected, is yet insufficient to insure proper and adequate fire alarm systems being designed and installed for the proper protection of vessels. Likewise, they are sufficiently broad to continue to allow for many interpretations by the various inspectors in the different inspection districts, thereby defeating the object of uniform and efficient equipment and installation practice.

The proposed rule has not yet been adopted, and it is to be hoped that before adoption it will be amplified sufficiently to permit the shipowner and operator knowing in advance the amount of protection that will be required for the safety of a vessel. There is likewise an economic factor which must be taken into consideration, because an owner having a ship built in one inspection district to operate from another, can ill-afford to have a fire alarm system which is not acceptable to the Department and Inspectors in any district from which the ship may operate.

Further, it is essential that uniform practice be established so that construction engineers and equipment manufacturers can properly interpret the department requirements in a way that will be uniformly acceptable.

Under the rule in force at present, one of the principal defects is that section of the rules relative to "protection of only compartments not accessible to officers and crew". From a literal interpretation of the law, it appears that lamp rooms, paint lockers, storerooms, linen lockers, life preserver rooms, baggage rooms, crew's staterooms, etc., being accessible to officers and crew, are therefore not required to have any fire detecting and alarm protection, although records indicate that the majority of fires aboard vessels originate in these compartments. It appears that the contemplated revised rule will alter this condition to some extent, but it is believed that it would be more desirable if the rule were more specific as to the locations aboard ships that should be protected against fire.

Other features should be taken into consideration in order to establish uniform practice, some of the more important of which are as follows:

(a) Fire alarm system circuits should be used for the exclusive purpose of transmitting fire signals.

(b) Fire alarm systems should indicate the presence of excessive temperature, at both the pilot house and engine room.

(c) Indications of fire should be made both audibly and visibly.

(d) Fire alarm systems should be fully automatic and required for the protection of all parts of every type of passenger-carrying vessels, and should be capable of the successive repeating of signals.

(e) Thermostats or detectors should be installed overhead in the compartments protected.

(f) Not more than ten staterooms should be allowed on a fire alarm circuit or zone or individual annunciating indicator.

(g) In case of large compartments, detectors or thermostats should be installed for every 144 square feet of area.

(h) Fire alarm mechanism for use at sea should be made of nonferrous material as far as possible, and where not practicable other materials should be treated against corrosion.

(i) All electrical contacts should be made of coin silver or platinum.

(j) Fire alarm systems should be under constant electrical supervision other than the trouble circuit should operate continuously and the trouble signal until manual attention has been applied.

(k) Fire alarm detectors or thermostats should be sealed against contaminating dirt or vermin.

(l) Provisions should be made for the efficient testing of fire alarm systems.

(m) Fire alarm systems should be energized by a potential of not less than 20 volts.

(n) A continuous source of current supply, such as duplicate sealed storage batteries with proper charging equipment should be available at all times.

If a ruling were made, predicated on the fundamentals outlined above, owners and operators of vessels would be sure of obtaining efficient fire alarm systems and uniform practice in installation methods, which would, undoubtedly, curtail the enormous fire loss to vessels and cargoes. Further, it would insure uniform fire alarm installation approvals in all inspection districts, and insurance companies should make due allowance in rates because the risk in ships so equipped would be materially lessened.

The foregoing, where it has to do chiefly with present and proposed rules governing automatic fire detecting and alarm systems, must not be considered, even if adopted in its entirety, as a panacea for all ills occasioned by the most hazardous condition at sea; namely, that of fire. No piece of equipment, whether the engine, steering gear, telephone, compass, or what not, is more efficient than the operating personnel charged with its maintenance and up-keep. As it is necessary to properly maintain the machinery of the vessel, so is it necessary to properly care for any type of fire alarm system.

It, therefore, becomes essential that a proper test and inspection of a fire alarm system should be made once a month, and preferably before each sailing of the vessel.

The design of automatic fire alarm systems today permits an inspection being conducted very quickly and thoroughly and its inspection should not impose a hardship upon any owner or operator. Experience has demonstrated in the case of all types of inspection work, whether ashore or afloat, that the most efficient inspection work is performed when conducted by a personnel who make a specialty of such work, submitting their reports to the proper authorities. This is not intended as a reflection on the operating personnel of any ship; but due to the fact that so many of the vessels of American registry do not carry electricians and the time of the engineer, whose additional duties are those of maintaining the electric lighting and power plant of the ship, is so consumed that it is physically impossible to give proper attention to the inspection and up-keep of fire alarms, telephones, and such apparatus of a technical nature which requires a proper knowledge of the equipment to obtain the best results.

The present rules governing automatic fire detecting and alarm systems and installations will probably remain in force until the next annual meeting of the Board of Supervising Inspectors. At this time, the study now being made by the department of this most important subject will no doubt be concluded.

If the new rules, which will undoubtedly be issued thereafter, contain the fundamental requirements, some of the most important of which are suggested herein, many lives may be saved as well as the enormous values in property losses now resulting from fire at sea.

Southern Pacific Ferry System

Largest Railroad Ferry System in the World is Maintained and Operated on San Francisco Bay for the Transportation of Passengers, Vehicles, and Trains by the Southern Pacific Company

THE Southern Pacific Company owns, maintains, and operates on San Francisco Bay and tributaries one of the largest railroad ferry systems in the world. The fleet of vessels operating on this system consists of seven passenger carrying steamers with a capacity each from 2200 to 3500 persons; eight automobile carrying steamers with a capacity each from 45 to 75 automobiles; two composite steamers; three freight and passenger car transfer steamers, two of these being the largest in existence today; and one fireboat used exclusively to protect the company's wharves, piers, slips, and steamers in the event of fire. The fireboat is under steam and manned with a trained crew the entire twenty-four hours of the day.

The train ferry Solano starting out of her slip at Benicia.

During the last three years these boats have transported safely over 82,000,000 people across San Francisco Bay, and at the present time they are handling an average of 77,400 persons daily. Compare this, if you please, with the early days of bay transportation when one small steamer plied between San Francisco and San Antonio, now East Oakland, making two trips per week, weather permitting.

Safety in transportation has been developed to such an extent on the railroads of today that statisticians inform us that it is less hazardous to travel across the continent on a train than to cross a main street in any large city. This degree of safety has not been neglected or overlooked on our water lines and every effort is put forth to safeguard the life and limb of those who travel on San Francisco Bay by water.

Safety Committee.

Since 1911 the Southern Pacific Company has made exhaustive studies of unsafe practices and unsafe conditions in the matter of operation. This important work is carried on by the employes themselves through an organized committee called a Safety Committee, which holds a meeting once in every month. The personnel of this committee consists of one or more representatives from each grade of employment; as for example, two captains, two first officers, two deckhands, two engineers. At this time there are twenty-four employes on the committee, including the superintendent, who acts as chairman. At every meeting suggestions for the safety of the service are proposed by the individual committeemen, or, for that matter, any employe has the privilege of proposing safety suggestions, and they are most heartily urged to do so. These suggestions are discussed pro and con by the committee, and if reasonable are adopted, or perhaps the committee cannot agree on the suggestion and the matter is held in abeyance and brought forward at the next meeting. For future reference, careful record is kept of all suggestions offered and their disposition. During the last fifteen years, since the organization of safety committees, there has been expended at the suggestion of the employes the sum of $15,000 in correcting unsafe conditions in this department. The more important work of the committee and the supervisory officers of the steamers is the training of the rank and file into the use of safe practices and the elimination of unsafe practices. A habitually careless employe is not only a menace to himself and fellow employes, but to passengers as well. Carelessness is not tolerated.

Government Regulation.

It is not a matter of common knowledge how far the regulations of the government go toward the operation, care, and maintenance of ferry craft. Functioning under the jurisdiction of the United States Department of Commerce is the Steamboat Inspection Service, which provides and enforces the "rules of the road" designed to make water transportation safe.

No ferry can operate longer than one year without a thorough inspection by the Steamboat Inspection Service. This is not a mere casual inspection, but means taking the vessel out of service; applying a hydrostatic test to the boilers; tests of steam pipes; examination of every life preserver, of every life boat, of the blocks and falls; careful examination of all water-tight compartments below deck, of life buoys, of fire pumps and hose, of fire extinguishers; and often times taking the vessel right out of the water that a more detailed examination may be made of the hull. These inspections are made by men who have had years of experience in the work and who may be rated as experts in this line.

When the inspection of the vessel is completed and such corrections made as the inspectors deem necessary, they issue a document called a Certificate of

S.P. TRAIN FERRIES

The Southern Pacific car ferry Contra Costa. This vessel, together with her sister ship, the Solano, is said to be one of the largest train ferries afloat. These ferryboats carry the overland trains from Benicia across an arm of San Francisco Bay to Port Costa. This ferry crossing has an international reputation for smoothness of operation. Passengers are frequently heard exclaiming, "Oh, we're on a boat! How did we get on?"

Inspection which permits the owner to operate the vessel for one year. After the vessel is in operation it is subject to a quarterly inspection by the inspectors. This is made while the vessel is in operation and consists of checking the life saving and fire fighting equipment, examination of boilers, engine, and auxiliary machinery.

In addition to the yearly inspection the Steamboat Inspection Service prescribes the number of life preservers, the number of passengers, the number of fire extinguishers, the life saving equipment, the amount of fire hose, the number and size of fire pumps. Every vessel must be equipped with one life preserver for every passenger carried and in addition thereto life-preservers designed for children, in number equal to at least 10 percent of passengers carried. Each Southern Pacific ferry is carrying from two to five hundred more life preservers than the passenger capacity of the boat demands.

Trained Personnel.

On Southern Pacific ferries the crews are drilled once each week in life boat launching and fire practice. Every member of the crew has a certain station to man when the signal for either of the drills is ordered by the captain and as a usual thing the drill is in the nature of a surprise. The life boat drill is generally held at night when the boat happens to be crossing the bay without passengers and is conducted in this way: The captain will cause a life buoy to be thrown overboard and the concealed man overboard bell is sounded; the members of the crew immediately report to their respective stations; the steamer is stopped, engines reversed, and is backed toward the supposed man overboard. When near the life buoy the steamer is stopped; life boat in charge of 2nd officer is launched and the life buoy recovered. The life buoy has been recovered in a minimum time of 4½ minutes.

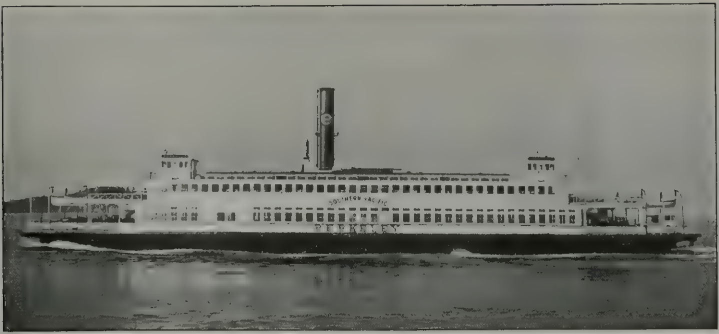
On an ordinary day there are approximately 533 in and out movements of ferry steamers from Slip 1 to Slip 10 in the Ferry Building at San Francisco. On March 14, 1926 the Southern Pacific handled 11,622 vehicles between San Francisco and Oakland Pier. That is the record number for any one day and no automobile on that day had to wait over more than one boat, and for the greater part of the day boats were running every 7½ minutes between those two points. During fog conditions this movement is reduced in order to lessen hazard in operation.

The result of all this safety work and careful inspection is shown by the records. During the past three years over 82,000,000 passengers have been transported across San Francisco Bay in Southern Pacific ferryboats without a single fatality. Such minor accidents as occasionally occur are mainly due to high heels causing female passengers to trip on stairways. Statistically, riding on a Southern Pacific ferryboat on San Francisco Bay is safer than stopping at a hotel or a lodging house, or even than staying at home.

Facilities for handling automobile traffic across the bay have undergone important improvements both at San Francisco and at Oakland Pier during the present season with the result that motorists find they can make the transbay trip with all the facility and dispatch of a hungry diner going through an automat.

At the automobile ferry station on the San Francisco side, the Southern Pacific Company, through the

Southern Pacific passenger ferryboat Sacramento, a typical side wheel, walking beam, steam ferry. This vessel was recently rebuilt at the Oakland shipyard of the Southern Pacific Company after many years of efficient service. She can take care of 3500 passengers comfortably. She is fitted with a restaurant and grill and an upper deck tea room. The Sacramento is 268 feet in length, 42 feet molded breadth, and 12 feet 8 inches molded depth, with a gross tonnage of 2254.



FIRST STEEL SCREW FERRY

The Southern Pacific passenger ferryboat Berkeley. This vessel, built in 1898 by the Union Iron Works, was the pioneer double-screw ferryboat on San Francisco Bay as well as the pioneer steel ferry. She is 261.4 feet long, 40.2 feet beam, has a passenger capacity of 2600, and is driven by a single, triple expansion, condensing engine working on a single line shaft running through from one end of the boat to the other, with a propeller at each end.

Board of State Harbor Commissioners, has widened the aprons at the ferry slips so that two automobiles can go on or off the boat simultaneously; thus reducing by 50 per cent the time required to board or leave the auto ferries.

Nearly all the posts supporting the roof over the passageway between the ferry building and the American Railway Express building have been removed, making it much easier for automobiles to approach the ferry steamers from any part of the area devoted to parking space, and this entire area has been paved. These new arrangements make it possible for auto ferries to leave the slips on a six-minute schedule when the traffic demands warrant extra boats.

On the Oakland side, a third auto ferry slip is rapidly being constructed and a large parking area built and paved so that there is no delay in handling automobiles to and from the boats. The new "pay-as-you-enter" system installed for automobiles has resulted in greatly speeding the loading of the boats.

This new pay system has been welcomed by motorists who are usually in a hurry to get to their destination. Unless the motorist tenders the collector a bill of unusual denomination, the automobile rarely has to stop at the collection gate. Most motorists carry the exact change and go by the gate without hesitating. Under this method even automobile lines of unusual length can board the steamer in a very few minutes.

An average of over 11,000 automobiles has been handled on the boats plying between San Francisco and Oakland Pier on Sundays during the present season. During the big peak loads over the Memorial Day and Fourth of July holidays, when 38,000 automobiles were carried during each holiday week end, automobile ferries operated on a seven-minute schedule and no automobile had to wait more than ten minutes to board the boat. Few had to wait at all.

Southern Pacific Company now operates 23 boats in its ferry service, and contracts for the construction of three modern diesel-electric, screw driven automobile ferryboats will be awarded within a short time. The new boats will be of steel construction and have a capacity for 80 automobiles, with provision for the comfortable seating of 500 passengers and a dining room to serve 50 persons at one time.

GARLAND LINE PROGRESS.

T. H. Halcrow, Jr., previously district agent of the San Francisco office of the Transmarine Lines in the East Bay section, has been appointed district freight agent of the Garland Steamship Corporation, according to a recent announcement by Neil S. Laidlaw, district manager at San Francisco. Mr. Halcrow's scores of friends in the shipping world wish him well in his new berth. During the past year Halcrow has been handling westbound ships at the Encinal Terminal in Alameda. In his new post under the Garland Line flag Halcrow will represent the firm on both sides of the bay. His headquarters will be at 260 California St., San Francisco.

VEHICLE FERRY.

The Southern Pacific vehicle ferryboat San Mateo, a modern double screw ferryboat of steel built in 1922 at the Union plant of the Bethlehem Shipbuilding Corporation, Ltd., San Francisco. The San Mateo is 216.7 feet length, 42.1 feet molded breadth, 17.3 feet molded depth. The gross tonnage is 1782.07. She can carry 75 to 80 automobiles, and is driven by the same type of power plant as the Berkeley pictured above, a triple expansion, condensing engine. Six boats of this type are operated at the present time by the Southern Pacific Company across San Francisco Bay.

Largest Drydock on the Pacific

Department of Public Works of Dominion of Canada Opens Huge Graving Dock at Esquimalt, British Columbia

J. P. Forde, M.E.I.C.

OF interest to all the shipping world comes the announcement from J. P. Forde, district engineer of the Department of Public Works of Canada, with headquarters in the Post Office Building, Victoria, British Columbia, that the new Esquimalt graving dry-dock at Esquimalt, three miles from Victoria, is now open and available for commercial service to all vessels.

This gives Esquimalt two dry-docks at this point. The new dock is a big step in advance for the Canadian government. The dock is the largest of its kind in all the British Empire and the second largest dock in the world, being practically the same in size as the famous Commonwealth dock at Boston.

The dock was designed and constructed by the Public Works Department of Canada, K. M. Cameron, M. S. C., M. E. I. C., chief engineer for the department, and J. P. Forde, M. E. I. C., district engineer in charge of the work.

The total cost of the development was approximately $6,000,000. The dock is 1150 feet long with a clear width at the entrance over the sills of 126 feet; the width at the top of the dock at the coping level is 149 feet; the depth of the water on the sills at high tide is 40 feet. The area at the bottom of the dock is 142,600 square feet; and when the dock is filled it contains 43 million Imperial gallons; and with the electrically driven pumps the dock can be emptied in three hours and twenty minutes.

The dock was designed and is able to accommodate the largest commercial or naval vessel afloat, the design being such that caissons can close the dock into sections, one 400 feet and one 750 feet long, to accommodate vessels of varying dimensions; or the full basin of 1150 feet is available.

All equipment around the dock is of the latest and most modern type as developed by the engineering profession, all being electrically operated. The dock is equipped with Bollards of the latest design, amply spaced around the dock, and there are nine capstans spaced at different intervals. Eight of these capstans are electrically operated giving a line pull of 25,000 pounds each at a speed of 12 feet per minute. The large capstan at the head of the dock gives a line pull of 65,000 pounds at a speed of 12 feet per minute.

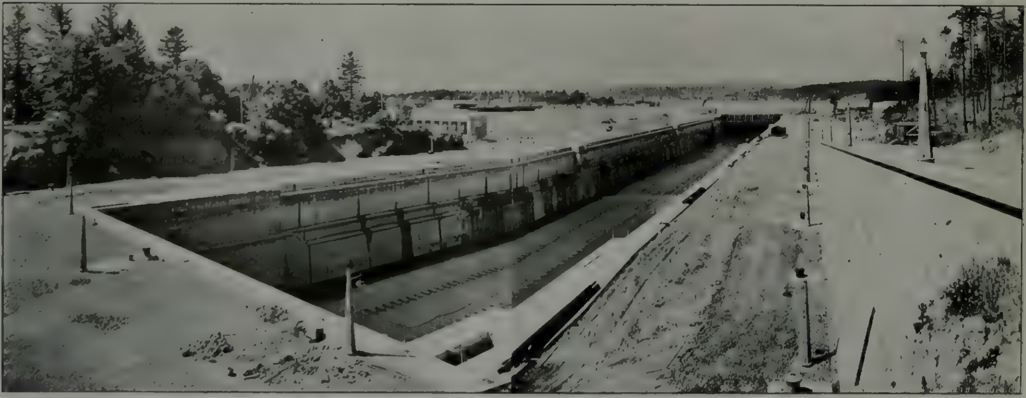
Machine shops and modern repair facilities are provided on the property, as this dock will be the Pacific naval base for the Royal Navy.

Esquimalt harbor is a land-locked harbor, with good deep water, having an area of approximately two square miles and possessing exceptionally good holding ground. Adjacent to the dry dock is the ships' repair plant of Yarrows Limited, who are equipped to do repairs on any and all classes of vessels.

Opposite the new dry dock is the old dry dock, possibly more familiar to the shipping world. This was originally constructed in 1887 by the joint efforts of Great Britain, Canada, and the Province of British Columbia. This dock is in excellent condition for serving the commercial world today. It is 450 feet long, 65 feet wide and has a depth of 29 feet of water on the sills at high tide.

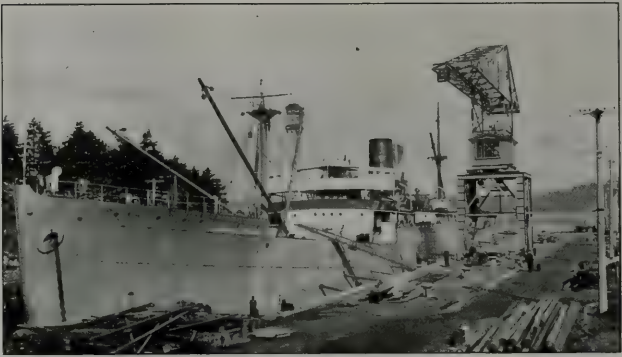
Under world wide competition the contract for the electrically operated, travelling, revolving boom Hammerhead crane for the new dry-dock has been awarded to the Colby Crane & Engineering Ltd. of Vancouver, which is associated with the Colby Steel & Engineering Co. of Seattle.

The crane will have a clear height over the coping wall of 50 feet and a reach of hook over the dock of 99 feet 2 inches. This carries the 25-ton hoisting hook 5 feet beyond the center line of the dock. An



General view of the great new graving dock at Esquimalt, with the water just over the keel blocks.

auxiliary hoisting unit is provided on the crane having a 5-ton capacity. The 5-ton auxiliary hoist will reach 9 feet from the center line of the dry-dock. This gives the crane ample power and facility to work over the center of the largest ship which might occupy the full width of the dock.



View of the older and smaller dock at Esquimalt showing Colby traveling revolving boom hammer head crane. A much larger crane of similar type will be furnished by the Colby Crane and Engineering Ltd., of Vancouver, for handling weights and materials at the new dock.

This crane will travel on a track approximately 3300 feet long, as it will be equipped with electric travelling swivel trucks and will serve both sides of the 1150 foot dry-dock, passing around the head end of the dry-dock, and the track will be extended on to the landing or service wharf a distance of 450 feet. All operations of the crane are controlled by one man, located in the operator's cab of the crane structure, where he can clearly see all the work and the surrounding territory, being able to travel the crane along the track, hoist or lower his load, or move same in or out on the boom, while rotating the boom structure, doing any or all of these operations as the work may require.

Railroad connections and railroad facilities are provided on the dock, and a railroad track will pass under the portal of the crane to expedite movement of machinery or other commodities to or from cars or boats held at the dock or along the landing wharf.

This is the second crane that this company has furnished the Canadian government for dry-dock work. Some five years ago they furnished the crane now operating at the old Esquimalt dry-dock. This crane has a capacity of 7½ tons at 76 foot radius. A photograph of this old crane accompanies this article, and when the new equipment is installed and turned over to the department, photographs and a description of this piece of machinery which was developed by the Colby company will be published.

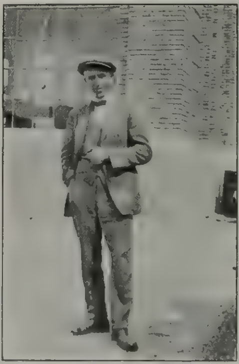
An Ancient Dock.

An unusual sense of contrast and an appreciation of the developments which have taken place in dry-dock accommodation during a century and three-quarters may be gained from a perusal of the following minutes of the Glasgow Town Council in August, 1758, relating to the installation of a dry-dock at Port Glasgow. The dock was designed by James Watt and is said to have been capable of accommodating simultaneously two vessels of 500 tons burthen each. It was kept dry by means of a pump worked by a horse!

"At a meeting with Mr. Webb on affairs of the dry dock—present, the Provost, Baillie Speirs, Provost Cochrane and Mr. Colin Dunlop, it was concerted that Mr. John Webb, ship carpenter in Irvine, should goe to Liverpooll and inform himself about the dry docks there and the dues payable by the shipping, from thence to goe to Wales and purchase a cargoe of about a hundred tons of oak timber for the use of the dry dock now building at Port Glasgow, and to cause ship the same for Port Glasgow. Mr. Webb to be paid the cost, charges and freight of the oak timber, and to be allowed for his experience and trouble in this affair thirty pounds sterling. Mr. Webb to be agreed with to take the charge of the dry dock at Port Glasgow for seven years from the time of its being fit to receive shipping, he being oblidged to keep men to open the gates and attend the shipping when in the dock, to levy the dues and account for same, and to be allowed thirty-five pounds yearly for his expence and trouble. Mr. Webb referrs to the Magistrates what gratuity he is to have for directing and overseeing the building of the proposed dry dock; but the Councill agree with this addition that Mr. Webb be oblidged to enter into contract with suretie for attendance on the docks and accounting to the Magistrates and Councill for the produce or dues of the docks, in such manner as they shall think fitt to direct."

From May 15 to November 11, 1761, the Town Council paid John Webb £105 on account of the dry-dock. In October he put in a claim for 100 guineas on account of the "trouble and expence" he had been put to, and this sum was awarded him.

How delighted James Watt would be to see that quiet efficient power known in his day only as a laboratory agent now acting as the motivating energy by which the great ships were being warped into this basin and the water being pumped out, and how his stout old heart would swell with pride to hear that this energy was being measured in units known the world around as "Watts."



Allan Craig, electrical engineer.

The electrical equipment on this Dominion of Canada Esquimalt graving dock is said to be the last word in dry-dock control and pumping efficiency. The installation of the electrically driven mechanisms was supervised by Allan Craig, chief electrical engineer in charge of electrical work at the Dominion of Canada dry-docks, Esquimalt, for the Department of Public Works of Canada. In a future issue of Pacific Marine Review we hope to show in more detail the electrical and mechanical features of the pumping plant and the caissons connected with this wonderful graving dock.

Latest Submarine Tender

U.S.S. Holland, designed and built by the United States Navy at the Puget Sound Navy Yard as a supply, repair, and salvage tender for the submarine fleet.

ONE of the latest additions to the United States Navy is the submarine tender Holland, recently commissioned from the Puget Sound Navy Yard, Bemerton, Washington, where she was built. This addition to the fleet is of 10,000 tons displacement, 506 feet length over-all, 61 feet beam, and 21 feet draft. This vessel created considerable interest and much favorable comment on the occasion of the recent visit of the Pacific Fleet to San Francisco Bay.

Her armament, while not warlike, is sufficient to enable her to put up a scrap of at least considerable interest. She has eight 5-inch rifles, one torpedo tube, and the regulation small batteries.

Primarily, the duties of the Holland will be to attend to the submarine fleet, administering aid and sustenance to the units of that branch, when needed. To better enable her to perform this duty, she is fitted with complete machine shops, foundry, and blacksmith shop, electric and torpedo repair shops, optical shop, and gyro facilities. Storage for a large number of spare torpedoes, thousands of gallons of fuel oil, lubricating oil, alcohol, kerosene, and other stores is provided.

The quarters for officers and crew are very comfortable and far and away ahead of former practice. In fact, a part of these quarters are designed and arranged for the use of submarine crews when they are resting from the cramped and uncomfortable living conditions which exist on the underseas craft.

The Holland is propelled by a 7000-horsepower Parsons type, compound turbine, with an astern turbine in after end of each unit, driving through reduction gear a single screw, which will develop a sea speed of 17 knots. Steam is supplied by two Bureau design, express type, water-tube boilers of large capacity.

Space prevents a detailed description; but it is of interest to know that the Holland has an exceedingly powerful windlass forward, built by the American Clay Machinery Company, so arranged with fixed and live sheaves at the bows that weights up to 500,000 pounds can be handled. This has been built into the hull proper in case of the need to raise a sunken submarine. A clever addition to this lifting scheme is that twenty side tanks can be filled when there is a heavy pull on the lifting gear, and then with all taut the tanks are emptied, creating a tremendous buoyancy lift to break out anything below.

Fresh water distilling apparatus, large enough to supply a small town, is part of the equipment; also an 800-kilowatt electric plant for submarine battery charging only. She has 500-kilowatt generators for the ship. This current has plenty of uses, as there are besides the lighting, many motors about the vessel operating laundry, bakery, blue-print room, lathes, planers, and ventilators. The electric generators and motors are General Electric. Deck hoists and steering gear are Lidgerwood manufacture. An exceptionally heavy stern windlass is supplied by the American Engineering Company. The Sperry gyroscopic compass is obviously a part of the navigation gear.

The hull, engines, boilers, and a great part of the furniture were built at the Puget Sound Navy Yard and show that this station is able to take on any sort of naval work. The Holland will remain for a few months on the Pacific and about the beginning of 1927 will take a trip to the Atlantic Coast. Her regular station, however, will very likely be at San Diego.

She is commanded by Commander J. B. Earle; executive office, Lt.-Camdr. F. K. Kelley; engineer officer, Lt.-Comdr. A. C. Bennett, who will also be engineer officer of submarine repairs. He will be assisted by Lieut. E. W. Dobie. The department of repairs will be under the direction of Lieut. H. H. Brown, as the operation of the vessel is distinct from her work in the repair line.

Taken all through, the Holland is a splendid addition to the navy and a great credit to the yard where she was built. A full crew of skilled mechanics will be carried, even to specialists on fine instrument work, such as range finders and periscopes. Large hospital accommodations are provided, and in every way she will be a truely mother ship to men and submarines alike.

Ship Seminole

(Continued from Page 389)

On January 6, 1869 she reached New York in 106 days from San Francisco. During the previous three days there had reached port five other ships from the same port of departure, the Black Hawk, 102 days passage; Favorita, 103 days; Robin Hood, 118 days; Sacramento, 121 days; and Star of Hope, 122 days. Returning to San Francisco the Seminole was 114 days and about the same time the Black Hawk was 131 days; the Favorita 135 days and the Robin Hood 129 days. On her passage to San Francisco in 1876, 113 days, she was beaten 10 days by the M. P. Grace, but on the outward run the following year she beat the Grace 7 days.

Shortly after her arrival at San Francisco in October 1887, the Seminole was sold by John Rosenfeld, successor to George Howes & Co., to A. M. Simpson & Brother of San Francisco. Her spars were cut down

(Continued on Page 400)

Buying for Steam Schooners

By Ralph W. Myers,
Purchasing Agent, Hobbs Wall & Company.

Ralph W. Myers

IT is to laugh when a request is made that buying for steam schooners be discussed from the standpoint of a purchasing agent. The steam schooner of the Pacific Coast is a coastwise tramp, generally specializing in the lumber carrying trade, and the purchasing agent for such a vessel or for a group of such vessels is required to be a sort of composite of port captain, port engineer, port steward, ship's husband, stevedore boss, traffic manager, and inspector.

Steam schooners are called such because the early coasting trade in lumber was carried on largely by schooners solely under sail power. These wooden vessels of shallow draft type ran up and down the coast taking lumber from rivers and from outports where it was not possible for deep-sea ships to load. As steam gradually supplanted sail, the name schooner stuck to the steamers and will probably continue to stick.

In the old days of sail it was customary for the captain to order his own deck supplies and the steward to attend to the commissary, and this custom held over into the early days of steam, with the addition that the chief engineer ordered supplies for the engine room. This old custom was gradually abandoned as group ownership developed and as the steam schooner began handling more general trade, and with these new conditions the composite character of purchasing agent, to which we alluded above, became an essential factor in the successful operation of these vessels.

The steam schooner fleet of the Pacific Coast is composed of some two hundred vessels ranging in lumber capacity from 200,000 to 2,000,000 board feet. This fleet is owned almost exclusively by lumber mill operators and is used very largely to carry lumber mill products from the small ports and rivers of Washington, Oregon, and northern California to the great lumber markets reached through San Francisco Bay and Los Angeles Harbor. The one way length of voyage on this service varies from 100 to 1200 miles and sometimes these vessels are chartered for longer trips to British Columbia or Alaska, running up to 2700 miles one way, or even for South American or intercoastal trades, getting up to 6000 miles one way.

In their regular trade on the short runs the deck department is called on for the exceedingly strenuous work of handling lumber cargo on and off ship. This work makes great demands upon the energy of the men and it is up to the purchasing agent, from motives of economy, to see that the crews on these vessels are provided with the very best food in plentiful supply and to know that the personnel of the steward's department on each ship is capable of preparing this food in such wise that it will be both strengthening and pleasing to the crew. Wise purchasing along this line minimizes labor turn-over in the deck department and greatly speeds up the turn-around of the vessel.

The composite purchasing agent for a fleet of steam schooners should have an intimate detailed knowledge of the requirements involved in the economical operation of engines, boilers, and condensers, for he will find that such knowledge will greatly assist him in getting closer harmony with the chief engineer. The same idea holds true for the purchasing of deck equipment and equipment for cargo handling machinery. Steam schooners run to all sorts of coast landings. Sometimes they take cargo from a dock or wharf on an open beach where the schooner has to be held away from the wharf by lines to buoys and is warped to the wharf for the handling of cargo. At other ports she takes cargo "under the wire;" that is, she is buoyed in position under an overhead cableway, which brings lumber down from a cliff or rocky point and drops it on the deck of the schooner. This variation in port conditions requires various deck equipment, and the purchasing agent must anticipate all requirements in order to insure safety of ship, crew, and cargo.

Each purchasing agent must of course surround himself with a certain amount of system through which he can check the life and usefulness of items purchased. This system, however, should not become so complex as to prevent the personal study by the purchasing agent of the application of items purchased to the practical work of the vessel in operation. For this purpose he should keep in close personal contact with captains, chief engineers, and stewards and, as far as possible, check their reports by personal observation aboard ship.

Intimate knowledge of detail and close personal supervision will frequently enable that composite character, the purchasing agent for a steam schooner, to effect great economies without sacrificing efficiency or quality.

An interesting relic on an old Oakland Estuary wharf, the deck house and pilot house of the old wooden tug Elizabeth. The house is now an office, the hull, cut down and equipped with a diesel engine, is still a useful workboat.

Bronze-Welding Copper

THE latest American practice in welding recommends that copper work requiring high strength, unity of composition and high ductility, be done only on especially deoxidized copper for base metal. It is now possible to purchase such copper, deoxidized with silicon, manufactured with the view of giving it the best welding qualities.

Starting with this base metal, the welding is done with a special copper rod containing silicon, using a neutral flame. The work is carried on quickly at the lowest possible temperature for satisfactory fusion. Silicon in the welding rod protects the base metal from undue oxidation. These practices carefully followed out, supplemented where possible by annealing or hammering, or both, give a weld that is perfectly satisfactory in all particulars.

For much copper work, such as repairs on existing equipment, or the use of stock sheets, metal deoxidized with silicon is not available. Many copper-smiths, maintenance men and steamfitters (especially the latter engaged in marine work) have found that a joint, tight and strong enough for most purposes can be made in ordinary stock copper with bronze welding rod.

An Eastern heating contractor has for some time been installing copper piping with such joints, testing them at city water pressure for strength and tightness. All of the work by this contractor has been good at the time of test; much of it has now been in use for several years with thoroughly satisfactory results, mainly in schools, court houses and other types of public buildings.

One of the questions often asked this man is whether or not he had ever noticed any galvanic action between the bronze and the copper pipe, especially in pipe carrying water. His reply is that although he had expected such action and had looked for it, this difficulty has never been encountered in his experience.

The technique for bronze-welding copper pipe, copper castings, and copper sheet is almost exactly the same as bronze-welding on steel or on cast iron. The parts to be joined are put into contact and must be heated to a temperature which will show red in the daylight, or just to the point where bronze will unite with the base metal, and a tinning layer of bronze is flowed on. Brazo flux is used freely in applying this first layer of bronze. After a surface has been tinned, bronze is built up on it to a proper thickness and width for the required joint. This work can progress along the seam in sections, tinning and building up 2-inch stretches one at a time.

On copper castings and material over ⅛-inch thick, it is best to bevel the edges. Welding is then done in the same way as described above. Considerable care must be used to see that the tinning coat is carefully and thoroughly applied to the bottom of the joint. Work should be completed as rapidly as possible, and with a minimum of heat. Be especially careful not to heat the copper any further back from the weld than necessary.

To provide for this last factor some oxwelders build up ridges of wet asbestos cement along the weld, far enough back so that these will not interfere with the work. If these tend to dry out they can be kept wet by adding water from time to time.

In summary: commercial copper, not especially deoxidized for welding, may be satisfactorily joined as follows:

Use a neutral flame, of minimum size.

Use first-class bronze rod and Brazo flux.

Work at temperatures just above the melting point of the welding rod.

"Tin" two inches of the underlying metal.

Build up weld metal on this tinned surface.

Repeat the process until finished.

Ship Seminole

(Continued from Page 398)

considerably, the lower foretopsail yard doing duty as a foreyard, and her rig was changed to that of a bark. Under command of Captain Hatch, and later under George E. Delano and Henry F. Weeden, she operated on the Pacific Coast, carrying coal from Puget Sound to San Francisco. Later she took lumber from Puget Sound to ports in the Pacific. In February 1898, after her arrival at San Francisco from Newcastle, N. S. W., with coal, she was purchased by Barneson & Chilcott, who subsequently dispatched her to Australia where she was sold.

Captain Weeden recalls seeing her at Newcastle laden with 1000 tons of coal bound for Adelaide where she was to become a store ship at the Semaphore. Hearing that she was to make the trip in tow of a steamer, Captain Weeden expressed the opinion to her master that she might sail away from the steamer, which, as a matter of fact she did, arriving at Adelaide ahead of her would-be towboat. The captain had not forgotten the time when his old bark, then well worn and heavily laden, had logged 52 knots in 4 hours.

CABLE SHIP DOMINIA

This vessel, recently built and engined by Swan, Hunter & Wigham Richardson, Ltd., for the Telegraph Construction and Maintenance Company, Ltd., is the largest of its type afloat. She is 509 feet in length with a deadweight capacity of 12,000 and speed of 14½ knots. Her first job, for which she is now en route, will be the duplicating of the British cable between Vancouver and Fanning Island.

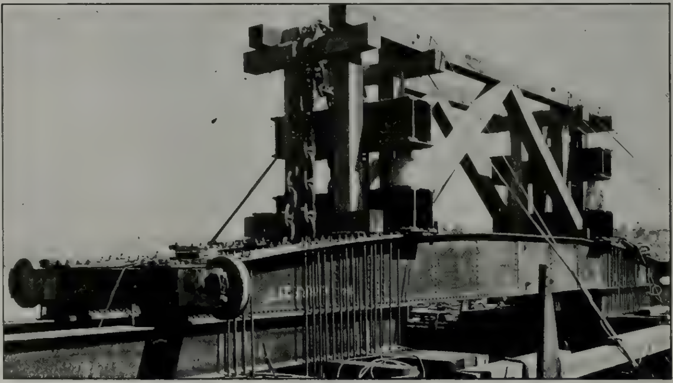
No American shipowner would raise the slightest objection to Uncle Sam building a few ships of this type and laying some American cables.

Salvage of the Navy Tug Lively

An Interesting and Economical Method for Raising Sunken Hulls

By C. W. Fisher, Lieut.-Commander,
United States Navy.

ON the morning of April 7, 1926 the U. S. S. Lively sank at her berth at the Navy Yard, Mare Island, in an upright position in about 42 feet of mud and water; so that at high tide about 3 feet of her smokestack showed. The Lively is a single screw, steel tug, 107 feet long, beam 22 feet, displacement about 300 tons. It was decided to raise the Lively by hoisting her sufficiently to place her in dry-dock, using wire rope slings and two 500-ton coal barges as the floating pontoons. The coal barges used are constructed of steel and are 110 feet long and 32 feet beam.



Close-up of one of the crane girders rigged across the barges, showing jacks in place.

While eight 2½-inch steel wire straps were being passed under the bar keel of the tug, four aft and four forward, the coal barges were prepared for lifting by spacing them 26 feet apart with six 12 by 12 vent the barges shifting position with relation to each other. Across the open space between the two barges timbers lashed at the rail and cross-lashed to prewere placed two heavy crane girders which happened to be available. One pair of these girders was 48 feet 7 inches long, while the other pair was 53 feet 6 inches long. These lengths not being sufficient to completely span the barges and the opening between them, they were in turn placed upon eight heavy 24-inch I-beams which served to transmit the weight of the tug to the barges in such a way as to reduce their listing to a minimum. Further compensation against listing was provided by placing about twenty tons of concrete and cast iron blocks on the outboard side of each barge.

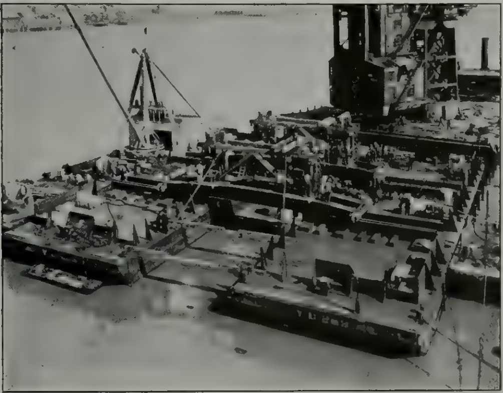
These I-beam supports for the girders were laid upon 12 by 12 timbers about 10 feet long, so as to span three frame spaces and distribute the load on the decks of the coal barges. The crane girders were secured by the I-beams with a number of 1¼-inch steel bolts, and the I-beams in turn were bolted through the steel decks of the coal barges. The bolts beneath the decks of the coal barges were fitted with 6-inch square steel washers, screwed home against 12 by 12 packing. The decks of the coal barges were further supported by wood posts fitted between the underside of the deck and the bottom of the coal barges.

After the wire straps were passed under the keel, each strap having a spliced eye in each end, these eyes were secured to the lifting chains, of which there were eight, two on each side forward and two on each side aft, the end of each chain being secured to two eyes of the wire rope slings. The chain used was 2½-inch Navy Standard stud link chain.

In holding the wire slings under the keel of the Lively a Kenter shackle was used, which was found to be of great assistance, as the link shape of this shackle, wholly lacking in projections or bolt heads, permitted it to pass beneath the bar keel of the Lively without jamming or fouling.

The barges being hauled into position above the wreck, the lifting chains were led up through 10-inch holes cut in the four pairs of jacking girders. These jacking girders were built-up box girders, made of short sections of 24-inch I-beams. The lower girder rested on the top of the crane girder. The upper girder rested on top of two 75-ton to 100-ton jacks; so that by operating a pair of the jacks the upper girder could be lifted, the amount of lift depending on the stroke of the jack.

The chain was secured to the upper jacking girder by means of a heavy U-bolt, which was a piece of 1¼-inch special treatment steel slotted out so as to permit one link of the chain to enter the slot while the link next above, being at right angles, would jam in the slot. The operation consisted of placing the U-bolts



General view of the operation showing barges taking the weight of the tug.

View of barges and tug in dock at Mare Island

in position on the upper girder, operating the jacks until one full link had been raised, then placing similar U-bolts to hold the chain in the lower jacking girder; slacking back the jacks; placing the upper U-bolts in the next link of chain; and repeating. Jacking was started at 9:30 a. m., April 20, and was continued until 4:00 a. m., April 21, taking 18½ hours of actual jacking time, which raised the wreck 16 feet 3 inches, a sufficient amount to enable the wreck, suspended from the two coal barges, to be towed into dry-dock and docked.

Upon landing on the keel blocks the usual bilge blocks were hauled into place, and as the strain on the lifting chains decreased oxy-acetylene torches were used to cut away the bolts securing the forward crane girder to its I-beam supports. The forward pair of crane girders was then lifted clear by the 40-ton drydock crane, thus permitting the two coal barges and the after crane girder to be hauled clear of the Lively, upon which the dock was pumped dry.

Upon pumping down the dock it was found that free access to the sea existed through the overboard discharge, and the condenser heads of the Lively, having been removed for repairs to the condenser just prior to her sinking, it was evident that water entered the boat through the overboard discharge opening, which was only a few inches above the normal water line.

All of the gear worked satisfactorily with an ample margin of safety and the cost of the whole operation, including the docking, was about $13,000. The illustrations show clearly the arrangement of the gear and the methods used.

Reconditioning Work on Swayne & Hoyt Fleet at Norfolk

SWAYNE & HOYT, INC., of San Francisco, recently purchased four steamers from the Shipping Board. These vessels, the Point Bonita, Point Reyes, Point Fermin, and Point Sur, required considerable overhaul and reconditioning. Henry F. Gelhaus, port engineer of Swayne & Hoyt, was sent from San Francisco to take charge of this work and awarded the work to the Norfolk Shipbuilding & Dry Dock Corporation, Norfolk, Virginia.

This firm, organized in 1900, owns 900 feet of river frontage on the Norfolk side of the eastern branch of the Elizabeth River at a point where the channel is 500 feet wide, with from 25 to 30 feet of water. On this water front property six piers have been erected from 250 to 400 feet long, giving a berthing space of approximately 3500 lineal feet. A four-section floating drydock 310 feet long on the keel blocks and with a lifting capacity of 4000 tons will take care of vessels up to 360 feet in length. A marine railway of 1000 tons' capacity is used for the smaller craft. There are fifteen cranes in the plant site and it has been effectively laid out with a compact modern arrangement of machine shops, electric shop, boiler shop, plate shop, mold loft, carpenter shop, joiner shop, copper shop, and administration building. All of these shops are thoroughly equipped with the most modern tools and with electric drive. Electric wires for lighting and for power for welding are run through the entire yard. The docks have fresh and salt water service, and compressed air lines are installed in profusion.

Two views showing set-up and completed job of thermit welding the stern frame on one of the Swayne & Hoyt freighters at the yard of the Norfolk Shipbuilding & Drydock Corporation, Norfolk, Virginia.

This yard is prepared to do any class of work in building or repairing wooden ships. They also operate two towing launches equipped to take care of the transportation of tools and men and materials from plant to ships loading or discharging at the piers in the port of Norfolk.

Ocean-Going Log Rafts

A Davis raft being delivered at an Astoria terminal.

OCEAN towing of logs and lumber in and out of the Columbia River is due to experience its most active phase during the present summer and early fall, with towing already well under way and preparations and contracts giving full assurance that this branch of the Columbia River's shipping will during the present season reach a peak not heretofore attained.

The Port of Astoria is keenly interested in development of ocean towing into the Columbia River, not alone because it adds the timber wealth of the Oregon coast to the enormous standing timber reserves immediately tributary to Astoria, but also because it brings large quantities of lumber from Oregon coastal mills to the terminals for assembling into cargoes and shipping in the off shore trade. Through lack of deep water harbors and berthage facilities, many of the mills in smaller Oregon coast ports are effectually barred from participation in the renumerative offshore trade, except as they ship their lumber to more favored points for deep water loading.

Ocean Going "Cigar" Rafts.

The most notable element in the Columbia River's ocean towing activity, of course, is the Benson Lumber Company's giant ocean-going "cigar" rafts which are towed south each summer from Astoria to San Diego, for manufacture at the company's mill located at that port. This year the largest dispatch of rafts ever made in a single year will be equalled, with five of the enormous structures being towed to California.

The Benson rafts each contain approximately 6,000,000 feet of logs, while each carries, in addition, a deckload commonly of cedar telephone poles. A raft will carry 100,000 lineal feet of poles in addition to its 6,000,000 feet of logs. One of the five rafts to be towed to San Diego this summer will carry a deckload of complete stripped trees instead of the customary poles. These full trees will be used for masts. Two tugs will be required during practically the entire summer to tow the five rafts to California.

Since the Benson Lumber Company inaugurated this rafting enterprise in 1906 it has sent 74 rafts to California. Of these, parts of two have been lost at sea. These losses occured early in the development of the method, and improvement of the construction methods of the rafts has resulted in greater strength and has so far reduced the likelihood of breaking-up; so that it has been many years since any portion of a raft has been lost. With the completion of the present year's towing program, 79 of these great rafts will have been towed to California.

Rafting Into the Columbia.

This rafting of enormous structures to California, while most important of similar Columbia River enterprises, nevetherless runs contrary to the general practice of ocean towing centering on the Columbia. By far the largest number of these undertakings represents the movement of logs and lumber into the Columbia River for manufacture or distribution.

For several years the Multnomah Lumber and Box Company has brought Davis rafts into the Columbia river from Yaquina Bay with the tug F. A. Douty, and is expected to resume the practice this season.

Development of a new kind of log raft, known as the boom type, during the towing season of 1925 has resulted in a sharp increase in the log-rafting business and has provided an extremely cheap method in raft construction suitable for fair weather and short tows and which, at the same time, gives very shallow draft, making it possible for the rafts to be taken out of coastal harbors with shallow channels.

These rafts are being towed up the coast from the mouth of the Siletz River. They are taken to sea over the Siletz bar by a shallow draft tunnel stern towboat, which turns them over at sea to the diesel tug Douglas for towing to Astoria, where the logs are milled by the Astoria Box Company.

Barging Lumber.

The department of this ocean-towing trade which reacts most directly to the benefit of the Port of Astoria is the sea barging of milled lumber from the coastal ports to the Columbia River for assembly at the Astoria marine terminals for dispatch to the east coast and foreign countries. This business was engaged in to some extent during the year 1925, and there are indications that the trade will be still more active during the present season. The traffic department of the Port of Astoria is applying the same practice to business originating on the river, and a large number of mills are engaged in the practice of booming or barging their product to the Astoria terminals for shipment.

The lumber depot facilities of the Port of Astoria and the strategic position of the terminals appeals to two classes of towing trade. The lumber assembled there for ocean shipment comes either from mills located on tidewater, but without either channel or dock facilities, or from plants making small shipments. To mills of the former class the opportunity for cargo shipment offered by the Astoria terminals has proved a great advantage, as it opens up to them the large field of water movement of lumber.

In the matter of small shipments it is not unusual for a single ocean steamer to load at the Astoria terminals, taking as many as seven different parcels of lumber barged or rafted from as many different milling plants.

Preparing a Great Yacht for a Great Race

Don Lee, of San Francisco, and a few of the trophies won by his yacht, the Invader, on the Los Angeles to Honolulu and Honolulu to San Francisco races.

JUST as a trainer uses every possible means to put the athlete under his charge in the pink of condition for every competitive event, so the owner of a racing yacht is careful to perfect every detail of her rigging, outfitting, and hull so that she may have the best possible chance to take advantage of every lightest breeze in outstripping her competitors. This is particularly true if the race be a long ocean event covering many leagues of sea and occupying many days out of touch with shore and with any base of supplies.

When, therefore, the Invader, Don Lee's crack schooner yacht, was entered for the Los Angeles - Honolulu, Honolulu to San Francisco race, no expense was spared to put her in the best possible trim.

The Invader was built at the famous yard of George Lawley and Son, Boston. She is built of special alloy steel. Her dimensions are 136 feet length over-all, 95 feet length at water line, 25.6 feet beam, 13.6 feet draft. The tip of the mast is 118 feet above the deck, and her full racing suit spreads 12,000 square feet of canvas. There are 93 tons of lead in the keel.

In preparation for the race her engines were removed and the bottom was scraped and refinished. For this purpose Holzapfel's International Trowel Cement was applied and rubbed to an approximately smooth surface. Then, after the cement had thoroughly set, Holzapfel's International Racing Composition was applied to produce a perfectly smooth surface calculated to reduce skin friction to a minimum. These two preparations are the result of long years of experience and research by the International Compositions Company and they have been used by many famous yachts in national and international competitions for the speed trophies of the world's great regattas.

The Invader captured the honors in the race from Los Angeles Harbor to Honolulu over the well-known yachts Mariner, Poinsettia, Mollilou, Teva, and Jubilo. The time was 12 days, 2 hours, 49 minutes; considered remarkable for a boat of this class. The three larger yachts, Invader, Poinsettia, and Mariner, then agreed to race for San Francisco, figuring 15 days, which would bring them in to the Golden Gate in ample time for the great Pacific Coast Regetta. The Invader won this race also, arriving in a little over 13 days. Total distance logged in both legs of the run was 4800 miles.

Don Lee sailed with his yacht; Ted Geary acted as skipper. Mr. Lee is particularly proud of one day's run of 311 miles at 6 points off the wind. "Never will I forget," says he, "one spurt of four hours reeling off a 15-knot clip. The greatest thrill I ever experienced under any form of locomotion."

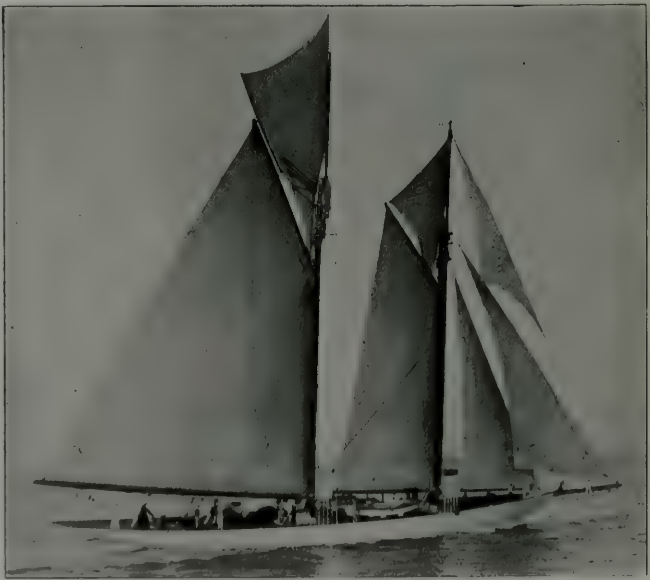
The crew and guests aboard the Invader totaled twenty-nine. To take care of the physical comforts of this party required some care in commissary equipment.

The Lipman Refrigerator was equal to all demands, conserving fresh milk and cream and keeping desserts and fresh meats and vegetables in first-class condition, even in the semi-tropical climate of Honolulu. It is said that one bottle of milk was perfectly sweet after three weeks in the refrigerator.

The Lipman apparatus installed in the Invader two years ago is a model 100 full automatic refrigerating unit. This unit supplies refrigeration for two large ice boxes and for a 50-pound ice maker. Direct ammonia expansion in piping through the boxes is used for a refrigerating medium. The unit has given great satisfaction for its two years of service and is in condition for many further years of useful work.

A Matthews gas engine-generator lighting set supplied ample electric light in conjunction with a 200-cell installation of Edison storage batteries. The Shipmate range was equal to all demands made on the doctor by the hungry yachtsmen and functioned perfectly in all weathers.

Another piece of equipment on the Invader which contributed largely to the safety and comfort of the crew and guests and did its bit in making possible the winning of this race was the fire protection equipment installed by the CO_2 Fire Equipment Company of Los Angeles. Five days out of San Pedro, fire broke out in spare sails stored in the lazarette between gasoline tanks. One CO_2 tank immediately came into action, putting out the fire and saving the yacht and the race—another evidence of the value



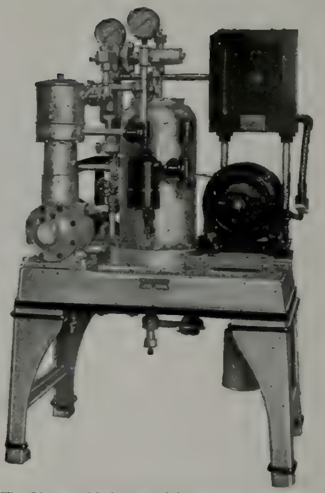
The schooner yacht Invader under plain sail.

of being prepared to meet emergencies. Mr. Lee declares that this Co$_2$ installation saved the lives of his guests, his crew, and himself, and warmly indorses CO$_2$ equipment as an insurance of safety on shipboard.

Don Lee is also particularly enthusiastic over the results secured from the use of Holzapfel's International Compositions, commenting on this he says:

"We used Holzapfel's International Trowel Cement first, then Holzapfel's International Racing Composition over it because we wanted the most perfectly smooth bottom obtainable, as that is what makes a sailing yacht go the fastest. To do away with skin friction was particularly necessary in this instance because of the light breezes we knew we would encounter in the race between Los Angeles Harbor and Honolulu and in the return to San Francisco. Holzapfel's International Racing Composition, International Towel Cement are the finest in the world."

The Poinsettia second in the race to Honolulu, also had her bottom coated with Holzapfel's International Racing Composition.



The Lipman, Model 100, full operating refrigerating unit of the type installed on the Invader.

Holzapfel's International Compositions are distributed in California by C. G. Clinch and Company of San Francisco and Los Angeles.

Some Union Diesel Sales

As of date August 1, 1926, the Union Gas Engine Company of Oakland, California, reports the following recent installations.

Shipment has been made of a 300 h. p. Union diesel engine, for installation in a 110-ft. fish-boat being built for Messrs. Medina & Soares, by the Campbell Machine Comapny, of San Diego. The boat was designed by Mr. M. Madruga. Some of the largest timbers ever handled in San Diego were used in the construction of the vessel. The keel as originally received was a piece of Oregon Pine 14x6-104 feet long. The keelson is 18x18-91 feet long. The engine timbers are 14x4-60 feet long. It is expected that the vessel will make a speed of 12 knots or better. She will carry enough fuel for a 4000 mile run at full speed. There are accommodations for ten men. The boat is the largest fishing boat on the Pacific, and will be used to make fishing cruises of from twenty to thirty days.

Installation of the 225 h. p. 6-cylinder Union diesel engine and auxiliary machinery in the U. S. Bureau of Fisheries boat Brant has been completed by the Union Gas Engine Company at Kruse & Banks Shipyard, North Bend, Oregon. The Brant, with a Congressional party, left for Alaska the early part of July.

A 50 h. p. Union diesel engine is being installed in Gloucester, Mass., in the new yacht which is being reconstructed for Mr. L. A. Norris, the winner of last year's San Francisco to Papeete yacht race.

A 225 h. p. 6-cylinder direct-reversible Union diesel has been shipped to the Philippines for installation in a towboat. This is the second Union diesel installation made in the Philippines during the past few weeks.

The French government has ordered a 75 h. p. Union diesel engine for installation in the schooner Mouette.

A number of 50 h. p. Union diesels are being installed in San Diego fish boats by the Campbell Machine Company, San Diego distributors of Union diesels.

The 110 h. p. Union diesel engines and auxiliary machinery for the new Associated Oil tankers have been completed, and will soon be installed at the Union plant of the Bethlehem Shipbuilding Corporation.

Three 75 h. p. Union diesel engines were shipped to Honolulu for installation in sampans.

Trade Literature

Mason Regulating Appliances, General Catalog No. 62, has been issued by the **Mason Regulator Company,** Boston.

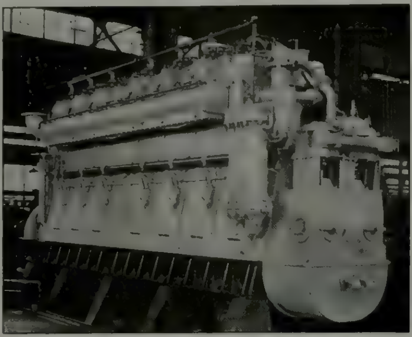
This company manufactures reducing valves, pump regulators, balanced valves, and draft regulators. This is a handy pocket size catalog containing 177 pages and numerous illustrations. This book is divided into five sections as follows: Section I., Pressure reducing valves. Section II., Automatic regulating devices for pumps; pressure regulators. Section III., Boiler pressure Regulators; damper regulators; fan engine regulators. Section IV., Balanced valves; Companion flanges, Strainers, Pilot valves. Section V., Tables for obtaining sizes of pressure reducing valves; General information for engineers and contractors; Telegraphic code.

The catalog also contains prices, instructions to purchasers, terms, guarantee, and also tables for obtaining sizes of steam pressure reducing valves and general information of interest to the user. Copies may be obtained from the company at Boston; the branch office at 606 Howard Street, San Francisco, or any of their agencies.

Kolster Radio Compass—The Standard Oil Company (Ind.) has contracted with the Federal Telegraph Company to equip the steamship Renown and the steamship Outagamie with the Kolster radio compass. This is in addition to the steamship Wm. P. Cowan, which already has a Kolster radio compass. The additional purchase of Kolster radio compasses on the part of the Standard Oil Company (Ind.) was predicated upon the satisfactory performance of the equipment on the steamship Wm. P. Cowan. These are Great Lakes vessels.

The Winton 800-Horsepower Diesel

Noted American Diesel Engine Manufacturer Invades the Field of Larger Sizes


Exhaust side of 6-cylinder, 800-horsepower Winton diesel engine.

THE illustrations on this page give a very good idea of the clean symmetry of line achieved in the new Winton 800-horsepower diesel engine especially designed for marine service. Five of these engines have recently been installed; two each on the yachts Arcadia and Savarona and one on the new dredge Virginia now building for the American Dredging Company.

This new 800-horsepower diesel is an exceptionally fine piece of engineering. The design follows the most advanced lines, the makers having incorporated in this new model many important refinements and improvements not heretofore seen in engines of this size. The company's engineering staff spent more than five years in intensive research work in preparing for this design. The result is that this engine shows some striking departures in its lines, being especially clean and symmetrical, and unusually compact, with exceptional strength and rigidity.

The engine is a 6-cylinder unit of the 4-cycle type, with 16½-inch cylinder bore and 22-inch stroke, developing 800 horsepower at 300 revolutions a minute. The crank case is made in top and bottom halves, each cast in one piece of grey cast iron and securely bolted together. The cylinder block or "water box" is also one piece of grey cast iron bolted to top crank case. These three castings are then through-bolted with 16 bolts of special alloy steel drawn up to put all three castings under compression and so take on the steel bolts all the tensile strains due to firing in the cylinders. The six close-grained charcoal iron cylinder liners are machined all over to insure uniform thickness of metal and maximum and even cooling of liners and pistons. The inside of the liners is ground to mirror smoothness.

Bu-Nite aluminum alloy pistons, of exceptional length and ground to dimension for the entire length, carry piston pin bearings of very large bearing area, the piston pins being clamped securely in the upper end of connecting rod. The crank shaft, cam shaft, connecting rods, valves, and other operating parts are of the well known high standard set by Winton diesel engine practice both as to materials and workmanship.

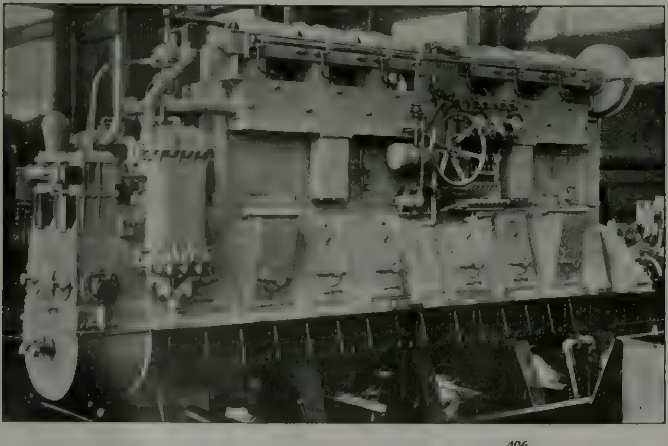
Speed regulation is effected through a well designed governor of the fly-ball type working on the overspeed principle and cutting in when speed reaches a fixed predetermined point. This governer controls the cut-off valves working on the suction strokes of the six plunger fuel pump.

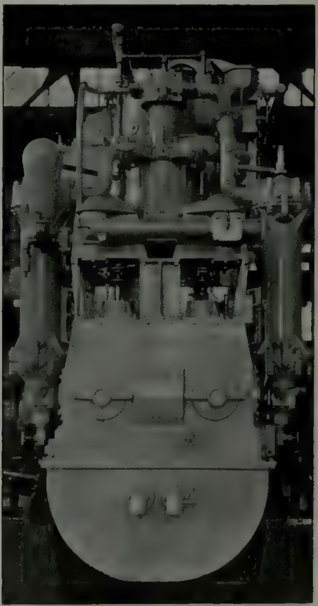
As will be noted from the illustrations, the water circulating pumps of the reciprocating type and the 3-stage air compressor are mounted on the forward end of the crank case. As built for marine installation, this engine is equipped with a thrust bearing of the single collar type, mounted on an extension of the bottom crank case. Force feed lubrication is used with an oil filter and oil cooler incorporated in the system. Exhaust and intake mufflers of efficient design insure quiet operation.

Equipped with adequate air bottles, gauges, revolution counter, fuel oil service pump, and set of tools, this 800-horsepower engine weighs 110,000 pounds. As a marine power plant, either for direct connection or for diesel-electric drive this new and larger model makes a very desirable addition to the Winton line.

AGENT APPOINTED.

The Western Engineering Company of San Francisco has recently been appointed Northern California representative and distributor for the products of the Ilg Electric Ventilating Company of Chicago. This company manufactures a line of electric ventilating fans, extensively used in ventilating systems aboard ship and in office buildings, theatres, schools.




At the left, operating side of Winton 6-cylinder, 800-horsepower diesel engine. Note the simplicity and the rugged symmetry of the design. Above, close-up view of the forward end of new Winton 800-horsepower diesel showing 3-stage air compressor inter- and after-coolers, water circulating pumps, and other features.

Pacific Workboats and Their Power Plants

British Columbia Boatyards

W. P. Lindley, Workboat Editor of Pacific Marine Review, has recently visited the boatyards and engine building plants of the Northwest. In this overland voyage Mr. Lindley covered thirty-eight hundred miles, making intimate contacts with the boat men and marine engineers of British Columbia, Washington, and Oregon.

In the following notes he gives a brief outline of his impressions of these establishments in British Columbia and in Seattle.

The power schooner Nigalik, built by the Vancouver Ship Yard, Ltd., for the Canalaska Trading Company. She has a 75 horsepower Atlas-Imperial diesel engine, and is especially designed for long trading voyages in the Arctic.

THE western coast of the Dominion of Canada is physically ideal for the operation of workboats. Its many sounds and inlets, with deep water close in shore and its many rivers flowing from the heavily wooded mountains give water channels down which are floated vast booms of logs and big barges loaded with the products of the many mills. This network of waterways extends for thousands of miles, giving easy transportation to principal ports from which cargoes to all parts of the world are sent out.

The provincial government of British Columbia has assisted this coast trade materially, and the past few years have witnessed a tremendous advance. The principal port is Vancouver, a modern metropolis on Burrard Inlet. Here are the headquarters of large and small shipping firms, also yards where workboats and bigger craft are built and repaired. A representative of Pacific Marine Review recently made a visit to this province and was struck by the amount of business done and the natural advantages afforded for building vessels of all kinds.

The largest yard at Vancouver is the **Burrard Dry Dock Co., Ltd.** This yard was started by Mr. Wallace many years ago, and this gentleman with his sons are still in control of the firm. The yard has a floating dock of 20,000 tons capacity, and plate, machine, blacksmith, and other mechanical departments to permit of efficient building or prompt repairs to any sort of craft. During the war period this yard turned out several notable vessels. Now it is engaged principally in repairing and drydocking. A force of 200 employees is kept busy, and constant additions to the plant are being made to keep it in readiness for any emergency.

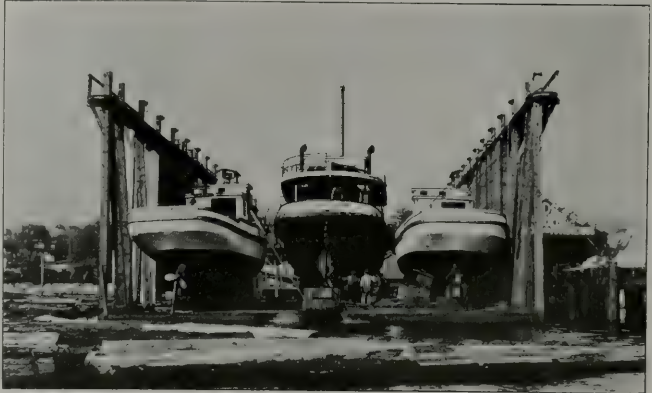
The Vancouver Ship Yard, Ltd. 1877 Georgia Street, Vancouver, turns out many workboats and some yachts that have made good records. Since the first of the year two seine boats of 63 feet length, and one of 65 feet have been delivered, and a 60-foot yacht is about ready to launch. This, besides general repairs, building of scows and dories, has kept the place busy. The yacht now on the ways is a fine type of vessel, teak planked and highly finished. Her power will be two Kelvin gas engines of 70 horsepower each. T. E. Leigh, a merchant of Vancouver, is her owner. The Vancouver Ship Yard is managed by Captain W. Watts, and Peter Wright is secretary and treasurer.

Crane's Shipyards, Ltd., 650 Denman Street, Vancouver, is operated by Joseph Crane, president and manager, with F. A. Bilodeau, secretary and treasurer. They specialize on barges and smaller fishing boats. Repairs on vessels are also done, and a marine railway handling 500 tons is part of equipment.

Hoffar and Beeching Marine Construction Company, Ltd., of 1927-1969 Georgia Street, Vancouver, have built six seiners and tenders since the first of the year. These were from 65 to 85 feet length, and for the most part engined by United States made diesels. H. S. Hoffar is manager, with C. G. Beeching president of the company. Business reported good and prospects bright for more.

The A. Linton and Co., Ltd., yard at 1737 Georgia Street, Vancouver, does a general repairing business for workboats and smaller craft. A complete plant and ways to handle up to 100-foot hulls is available. C. E. Johnston is president and general manager, with D. M. MacDonald as secretary and treasurer. These gentlemen are optimistic as regards workboat building and repairing, reporting present business good and prospects bright.

Chappell Bros., at the foot of Denman and Georgia Streets, Vancouver, have recently turned out two 65-foot seiners. They do a lively business in



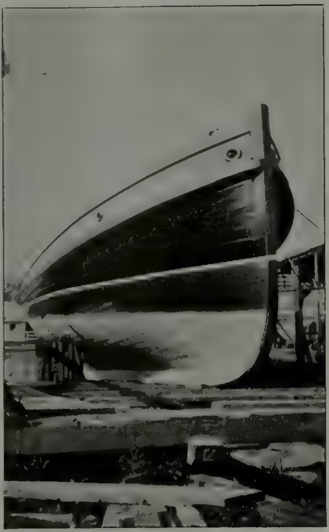
The floating dock of the Vancouver Drydock & Salvage Company with three workboats up.

workboat repairs, having good facilities for this. A ways to take 90-foot craft, with complete wood and metal working machinery in the shops gives the firm facilities to handle any work.

The Vancouver Dry Dock and Salvage Co. of North Vancouver reports brisk business in workboat building since the first of the year. This firm is young, having only started the latter part of 1925. Since that time it has turned out six 65-foot workboats besides smaller craft. A small but modern floating dock to lift 800 tons, electrically operated, with a modern equipment of wood working machinery, gives the firm every advantage in the way of turning out jobs quickly and well. The general manager is E. F. Cribb, and yard superintendent is V. Eriksen.

Among the operators of workboats, the Pacific (Coyle) Navigation Co., Ltd., is probably the largest individual firm in the Northwest. They keep in operation 21 tugs of all classes and 30 large scows, all plying in British Columbia waters. They also have 10 large seagoing lumber and log carrying barges with capacities of 1,000,000 feet. This firm is in practical control of the business, it being an amalgamation of several others. The president is E. J. Coyle, and general manager H. J. Tourney is assisted by Captain J. L. Hudson.

W. R. Menchion, of 1705 Georgia Street, has been in the workboat building business for eighteen years. Mr. Menchion reports business good, he having delivered six boats since February last, five of 75 feet length, and one of 65. They were all powered by **Atlas-Imperial** diesels, and are giving great satisfaction to their operators. The yard has also refitted four boats for the Goss Packing Company, and at present have two 75-footers on the ways building. Hull construction on these is exceptionally good. A feature is the solid filling with cement between all frames in the engine room, it being carried well up the sides, and also to the level of the engine bed pieces. Mr. Menchion, who by the way is from Newfoundland, is reckoned as one of the best builders. He has recently refused ten other jobs to build hulls, preferring to put his very best into a limited number than to take on too many and be obliged to rush them too much.


Workboat John Davidson, building at the Star Ship Yard Co., New Westminster.

To supply motive power for these many hulls built in the Northwest diesel engines are most in demand. Few are now fitted with steam or gas. United States built diesels appear to be most used, those from the west coast predominating. All the more prominent makes are represented by agents or branch offices in Vancouver.

Victoria, on Vancouver Island, while not so active in workboat building as the mainland, also has several yards devoted to ship building and repairs. **Yarrow's, Ltd.**, at Esquimalt, do a steady business in this line on new and old vessels of all classes, both wood and steel. Since the first of the year they have built five hulls engined by **Atlas - Imperial** diesels. These are in addition to general repairs and the construction of three heavy caissons for the new dominion government dry-dock. At the time of the Pacific Marine Review representative's visit the ocean tug St. Faith was on the ways. This vessel is of steel, exceptionally heavily powered. She was built for a rescue tug at the time of the war for the British Admiralty, and was brought out to the Pacific Coast by Yarrow's and refitted by them for the Powell River Timber Co. Yarrow's have changed her to an oil fuel burner, tankage for nearly a month's fuel being built in. A heavy towing engine has been installed, and all needed changes made. She will be a practically new job when finished, and will do ocean barge and Davis raft towing between Queen Charlotte's Islands and Powell River. Yarrow's Ltd. have a fine location near the large graving dock of the dominion government, which they use when any jobs are too heavy for their ways.

The **Victoria Machinery Depot Co., Ltd.**, Victoria, is a yard which during the high pressure period of war turned out several large vessels for the dominion government. A fine marine railway to handle 3500 tons, together with all modern tools both for steel and wood construction serve to give the establishment means to handle ship work of every kind. While no new steel building is going on now, repairs keep the yard busy, an average of 100 men being employed. This firm has the privilege of using the 1150-foot dry dock at Esquimalt, and can arrange to handle the heaviest tonnage. A specialty of the shops is building electric welded tanks for fish oil storage. In this industry millions have been invested, with a big call for absolutely tight steel tanks. The location of the yard is fine, having deep water alongside the wharves and cranes, with railroad advantages as well. Originally started by the late Joseph Spratt, a pioneer in British Columbia ship building and machine shop work, the company is now operated by M. E. Spratt, managing director; W. J. Brinkman, general manager; V. K. Gray, secretary and treasurer; and H. S. Hamill, purchasing agent.

Turpel's Ways & Shipyards is one of the oldest established on Vancouver Island. Wm. Turpel, the founder being now in his eighties. Still hale and hearty, he leaves the active business to his sons, Emerson and Samuel, who, with William Norie, attend to details. Since the war period, like all other yards, this one has been at times slack, but since the first of 1926 business has picked up materially. In addition to several 65-foot workboats and numerous big barges, they built the tug Strath for the Victoria Tug Company. This vessel is 80 feet 6 inches long, 20 feet beam, and 11 feet 9 inches depth. She is powered

Ocean-going diesel engined tug Strath, built by Turpel of Victoria, B.C., for the Victoria Tug Company.

by an **Atlas-Polar** diesel, developing 280 brake horsepower. She has only lately been put into commission, and the manager of the tug company, Captain George McGregor, says she is one of the very best of her kind afloat. She has fuel capacity to permit of steady running at a 10-knot speed for 40 days. Her accommodations are specially arranged for comfort on long cruises. Powerful electric driven pumps and winches, with towing engine, etc., are installed. The Strath is one of a fleet of several others operated by Captain McGregor's company. They also have 20 heavy barges and other equipment for general work.

New Westminster, B. C., on the banks of the Frazer River, is one of the oldest cities in the Northwest and, though well situated for shipbuilding, has not been particularly active in that line. However, the **Star Ship Yard Co.,** at Lulu Island, has built many vessels of the workboat and ferry types. Recently they have turned out the snagboat Sampson for the dominion government, a sternwheel steamer, and the tug John Davidson, an 85-foot tug. A specialty is made of this kind of craft, as well as heavy barges and general repairs. These are taken care of by a well equipped yard and ways to handle 500 tons. E. Mercer is manager and owner, one of the old school type of shipbuilders, believing in strong and good work.

The A. & L. tug hauled out on the ways at the New Westminster Marine Railway

The New Westminster Marine Railway at Lulu Island is at present engaged in general repairs, though seiners and barges are built. J. Daws is manager. Lately they have had the Abernethy & Lougheed Co. diesel driven tug on their ways for complete repair and overhaul. This vessel is one of a fleet of several others engaged in log towing. She is engined with a **Washington-Estep** diesel of 110-horsepower and is a very strong and able vessel, handling tows of 22 section log booms from Port Haney to Vancouver, a big drag in the tide waters. Her engine has given fine service and the operators are contemplating building a still more powerful vessel which will be Washington-Estep engined.

Workboats at Seattle

PUGET SOUND is hardly ever vexed by heavy seas. Being well land locked it is ideal for towing log rafts and operating barges heavily laden. Consequently hundreds of workboats are engaged in active business there. Many are the small cities and towns on the shores of Puget Sound. Also saw mills and fish canneries and curing places. Different sorts of factories too, are numerous. All these employ workboats.

Seattle, the Queen City, is the registration point of nearly 2000 sizable workboats, in addition to the deep sea fishing craft that operate from that port. During the past few years the workboat building and repair business has more than doubled, and from a survey of the situation made lately by a Pacific Marine Review representative it is evident that the point of saturation is still many years ahead. Millions of dollars are already invested, and considering the vast possibilities in natural products and manufactured materials in the vicinity of Puget Sound, it is a fair assumption that billions will be invested in transportation facilities there in not so many years hence.

Seattle has a double advantage in the building of workboats, as the large lakes within her boundaries give deep water, fresh and clear, fed by the snows of surrounding mountains. All seafolk know of the advantages of fresh water for ships. And by locks the big lakes near Seattle are connected with the salt waters of Puget Sound, giving ideal conditions. These conditions have been taken advantage of by many firms, and Seattle has achieved an enviable reputation for the building of good hulls.

To propel these craft, engines must be constructed. Formerly these were steam, then came gasoline, now both are being displaced for the most part by diesels.. Of these the many good ones on the market are all represented. Some are imported from different outside manufacturers, and a very popular type the **Washington-Estep** is built in Seattle. This engine was designed by a young man, a native of Seattle, and is the result of years of experience combined with the latest methods of construction. Users of the Washington-Estep are as one in praising them, and this praise is not due alone to pride of local production, but also the excellent records made by this engine in hard service. The **Washington Iron Works,** one of the oldest in the city, built this diesel, and their splendid organization and complete plant ensures a finished product of precise machining and of prime quality in material.

The field for workboat propulsion is so large, however, that many other builders have established agencies. The **Atlas - Imperial** diesel, built in Oakland, is handled by **Mr. O. E. Nilsen,** 82 Marion Street, Seattle. While Atlas-Imperial engines are the leaders, Mr. Nilsen is agent also for the Sterling Gas, Regal Gas and Kahlenberg heavy oil engines. He also deals in many other high class marine specialties such as the Johnson-Freis air steering gears, Hyde propellers.

The **Union Gas Engine Co.,** has its diesel and other type engines handled by the **Star Machinery Co.,** 1731 First Ave., S. This firm make a specialty of handling new and reconditioned machinery of all sorts, either for land or marine purposes. A completely equipped and large shop with skilled mechanics ensures good work, and their output finds ready sales. Mr. O. R. Rabel is the active manager, and this gentleman is very optimistic over the business situation in the northwest.

The **Worthington Pump and Machinery Corporation** are also in the marine field, and have recently installed a set of their new 200 h. p. two cycle direct reversible diesels in the tug Vigilant. This vessel has made a remarkable showing both in speed and towing power. The Worthington Corporation chief at Seattle is Mr. E. D. Schively, manager, O. W. Stokes, J. O. Borst, and C. D. Cummins are his aids, and all being trained technical as well as practical engineers, this organization is able to handle all problems confronting the buyer or operator. Offices are in the L. C. Smith Building, Seattle. In connection with the Worthington marine department, Messrs, Ginnett & Tramill will have an installation depot at Fishermen's Dock, Ballard, where marine engines of all sizes can be placed in vessels. The Worthington people intend to make an aggressive campaign for this business in the future.

The **Western-Enterprise** diesel is sold in the northwest by the **Pacific Marine Supply Co.,** 1217 Western Avenue, Seattle. Mr. Ralston Cunningham is manager of the engine department of the company, and reports many Western-Enterprise installations in deep sea fishing workboats and Sound tugs. The Pacific Marine Supply Co. carry a large stock of spares and also several stock diesels, besides a very complete line of all sorts of marine supplies and hardware, specializing also on nets and twines for fishing work.

BOAT YARDS.

King & Winge Shipbuilding Co. located on the waterfront of Seattle, at 2231 East Marginal Way, have a well fitted shop for repairs and building of boats and heavier craft. Ways to handle 600 tons, and a smaller set up to 300 tons, supplemented by a corps of fine mechanics handled by Mr. H. Rogers, master machinist, insure prompt and good hull and engine repairs. Mr. J. E. King, president of the company is also active manager of ship work, and Mr. W. Bell is secretary and purchasing agent. The yard builds many light dories for the fishing fleet.

N. J. Blanchard Boat Co., located at 3201 Fairview Avenue, Seattle, have their shops and yard on the fresh water shore of Lake Union. This firm has been in business for past 15 years, and gained a fine reputation for good design and work. Mr. N. J. Blanchard, president, with Mr. C. P. Blanchard as vice president. Secretary and purchasing agent is Mr. W. L. Schoenman. The firm has been very busy the past season, building both workboats and yachts. A notable example of the latter type of vessel is the Malibu, just gone into commission. She was designed by Mr. L. S. Geary, naval architect at Pier No. 1, Seattle, and is something out of the ordinary as regards design and completeness. The Blanchard Co. also built the yacht Wanda, and the 65 foot speed yacht Hermina, which with her two 225 horsepower Van Bleerk engines keeps a sustained speed of 30 miles per hour. The yacht Malibu, a larger vessel, has two 120 horsepower Washington-Estep diesels and makes about 12 miles. The Blanchard Co. also built the 75 foot workboat Highway for the Federal Road Bureau, which is powered by an Atlas-Imperial diesel of 110 horsepower.

The workboat Highway, built by the N. J. Blanchard Boat Company, Seattle, for the Federal Road Bureau and powered with an Atlas Imperial 100-horsepower diesel.

The **Puget Sound Engineering Co., Inc.,** of Seattle, have opened up the yard at Ballard formerly operated by Meacham & Babcock. The site is a fine one, the plant is roomy and well located, and the new owners hope to get a share of the marine business. Besides the general machines of the construction and repair shop, a 20-ton wharf crane is available. Dry dock and ways, with appliances to handle either steel or wood construction and repair are part of the equipment. Mr. O. R. Lingenfelter is general manager. The location of the yard is at 15th Ave., W., and Emerson street.

Fishing Owners Marine Ways, Inc., at 15th Ave. W. and Thurman street, on the shores of Lake Washington, Seattle, employs some 30 men constantly at the repairing and building of fishing craft. Since the first of the year five new deep sea fish boats have been built and several hundred overhauled. The firm is a closed corporation composed of owners and operators of fishing craft. The officers are: Albert Linvog, president; E. Ericksen, vice president; I. Heggem, general manager, and O. M. Guldjord, purchasing agent. Future building is in sight, and prospects reported good.

View of dry-dock and outfitting wharf Lake Union Drydock & Machine Works, Seattle.

The **Grandy Boat Co.,** 2538 Westlake., N., Seattle, Wash., is a small but busy yard on the shores of Lake Union. Messrs. W. F. and E. L. Grandy, brothers, are the proprietors and active in control. Catering to the smaller craft along the lines of repairs, they have a marine ways to handle 75 foot boats. A well equipped shop for both engine and hull work is kept busy. This firm has been operating for the past two years, and report business fair.

Lake Union Dry Dock & Machine Works is one of the largest establishments on that fresh water body. This company, established in 1919 has the following personel: J. L. McLean, president; Otis Cutting, vice president and general manager; L. C. Donley, purchasing agent. An average of 120 men are employed in the various departments, building and repairing of all classes of vessels being done. There are five docks, the largest taking vessels up to 3500 tons. Since the first of the year 15 new hulls have been built for workboat service, ranging from 90 to 35 footers. Besides these several speed boats were turned out, three of which make 45 miles per hour. The yachts Gosling and Pirate were built at this yard for Los Angeles parties, as was the Mary for Seattle interests. A volume of business aggregating $250,000 per year is done, and business reported good.

The **Ballard Marine Railway Co.,**

A view showing work proceeding on power boat for Siberia building at the Ballard Marine Railway. This picture was taken on the eighth day after the contract was signed. The boat was finished complete, with engine installed, in ten days.

like most of the yards on Lake Washington shores, confines itself to the building and repairing of wooden hulls. While in the past some sizeable vessels have been built there, at present, activities are directed to workboats for towing and fishing, barges and yachts. The Jessemar is a fine sample of Ballard yacht building. The tug Mahoe for Honolulu, was turned out here, and has given excellent satisfaction to her owners. Since the beginning of 1926 the company has constructed nine boats, among them U. S. Survey boats, fishing vessels and tugs. Of these three were powered with diesels. Some 70 men are steadily employed, and while the yard is not working to full capacity, business is fair.

A quick job was recently turned out by the Ballard Marine Railway Co. A contract to construct a small tunnel workboat 27′ x 9′, very light draft, was made with the guarantee that she would be ready in ten days from date. Our illustration shows her on the eighth day, and she was put into the water the day after. Besides the workboat, intended for Siberian waters, were built two barge scows of 34 feet each. These craft were shipped by steamer to the north all in order, within the time specified. This workboat is driven by a 35 horsepower Regal gas engine, and together with her barges will be used for general freighting and trading around the Kamschatka peninsula.

Sea Going Motor Yacht Malibu

THE motor seagoing yacht Malibu, built for Mrs. M. H. Adamson, of Los Angeles, by N. J. Blanchard Boat Company of Seattle, was designed by L. E. Geary, Seattle, naval architect. This craft has many features to commend her arrangements. The workmanship and finish are of the highest order, and taken all together she is a most complete and workmanlike job. Homelike comfort has been looked for more than speed, but her two Washington-Estep, 4-cylinder diesels will give her lots of power. These engines are of the latest type, and embody some features new to operation. Most marked is the remote air control, by which the engines can be maneuvered from the pilot house. Special attention was given to light and ventilation for the engine room, something not often given much thought in a yacht.

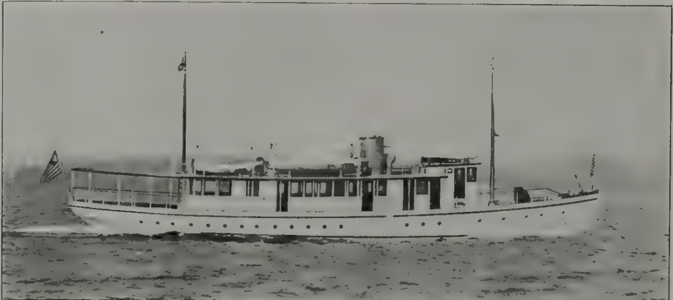
In every detail much thought has been expended in the outfitting of the Malibu. Her refrigeration plant is a Servel of ample capacity to handle all provisions and provide ice in the most tropical climate. In the fore hold is an American Radiator Company heater, fired by oxo-gas. This fuel is also used in the galley range, installed by Lang of Seattle. The CO_2 Fire Esuipment Co. of Los Angeles has installed a fine stand of four gas flasks, ample to cope with any fire should one occur. All staterooms, especially the owner's, are large and roomy for a yacht, and each is equipped with private bath and toilet.

A 3½-k. w. Fairbanks-Morse, 110-volt generator, driven by a Bolinder semi-diesel, is supplemented by another generator of the same type driven from the fly wheel of the port main engine. Either of these units is ample for the requirements of the vessel. To give electric service, if it is desired that no machinery shall be in operation, an Edison Exide iron clad bank of batteries is available, with sufficient capacity to supply current for ship lights at 110 volts for twenty-four hours.

The anchor hoists were built by Bennet of Seattle, and are specially designed and built to insure reliable service under the most trying conditions. The same firm installed two of their electric boat hoists, by which the heavy motor cutters can be easily put into the water by two men. These electrical units are of Lee Bennet's design, constructed to operate in either direction at will, can be easily opened up for inspection, although absolutely water-tight.

A Delco system supplies both hot and cold fresh water to all the living quarters and galley, under sufficient pressure to give rapid delivery. The hot system is on the automatic circulating plan, that no waste may occur, a hot flow following opening of faucet.

Engine room telegraphs were furnished by Chas. Cory & Son, Inc., and the mechanical equipment of the engine room is complete in every way. A fine wireless set, with direction finder, signalling apparatus by Strombos, and everything needed for safe navigation has been provided.



The seagoing motor yacht Malibu, built by the N. J. Blanchard Boat Company of Seattle for Mrs. M. H. Adamson of Los Angeles and powered with two Washington-Estep diesel engines of 120 horsepower each.

Auxiliaries—Ship Supplies—Marine Equipment

The Steward Davit and Equipment Corporation

Group of notable marine men at demonstration of Steward line-throwing gun. Left to right: W. Bennett, R. B. Steward, C. W. Clapper, General D. N. Hoover, D. Arnott, Arthur Gifford, Captain T. F. Norton, Albert Buckler, Captain N. B. Nelson, Captain H. N. Seeley, and Thomas Moy.

A NUMBER of men distinguished in the marine affairs of the country went to Hudson, New York, on July 8 last to visit the plant of the Steward Davit and Equipment Corporation.

D. N. Hoover, supervising inspector general of the U. S. Department of Commerce Steamboat Inspection Service, who was recently appointed as the head of this important service to succeed George Uhler, Captain Henry M. Seeley, supervising inspector, 2nd District and chairman of the Life Saving Committee of the Board of Supervising Inspectors, Captain N. B. Nelson, supervising inspector of the 9th District, Cleveland, Captain T. F. Norton, local inspector of Hulls, Albany, D. Arnott, chief surveyor of the American Bureau of Shipping, William Bennett, senior surveyor of Lloyd's Register of Shipping, and Albert Buckler of Gibbs Bros. Inc. were among those who visited the Steward Davit plant and witnessed a number of interesting tests of marine equipment.

Tests were made of the Steward lifeboat detaching apparatus. A 26-foot lifeboat was suspended by hooks of two different types. The first test was a type of hook which is impossible to release before the strain is off the falls. The usual condition being when the boat is waterborne, by swinging the boat clear and subjecting it to stresses and conditions such as may be encountered when lowering a lifeboat in bad weather, it was shown by the test that is impossible to release a gear of this type until the strain is off the falls.

The second test consisted of a type of hook that permits the boat to be released while the strain is still on the falls. This arrangement is such that the boat can be released at the moment desired by the man in charge of the boat. The tests showed that this could be done, and in both cases it was convincingly demonstrated that both ends of the boat can only be released simultaneously.

A number of other marine devices were examined such as non-toppling and non-twisting blocks, and patent air ports, after which the largest pair of mechanical davits ever built in America was subjected to various tests. These davits were built for the new steamship Malolo, designed by Gibbs Bros. Inc., New York, and being built at the Cramps Shipyard, Philadelphia.

The davits are for handling the motor lifeboats, which, on this vessel, are very elaborate and very heavy boats. The test load applied to the davits was 42,840 pounds, this being double the maximum weight of the motor lifeboat with its full capacity of people. After the davits were tested in the inboard position, they were operated to the full outboard position by the crank handle, and while in that position with the load suspended, were subjected to the hammer test. The booms were then removed from the davits and subjected to the drop test.

At noon the party drove to a farm four miles from the City of Hudson on the Albany post road where the testing field for firing marine line throwing guns is situated. After luncheon at the farm house, a number of tests of line throwing guns were conducted. The equipment used was the standard equipment manufactured by the Steward company and as prescribed by the rules of the Department of Commerce Steamboat Inspection Service. The amount of powder used was varied and the special type of powder most suitable for this purpose was used. The first shot was made intentionally with an overload of powder which caused the line to break. After this test the amount of powder was reduced and a number of shots fired perfectly, the projectile inciting and carrying out the full 1700 feet of line. The firing was remarkably accurate and was considered by all those present to be a splendid exhibition of the usefulness of this piece of equipment.

Trade Literature

The United States Coast and Geodetic Survey, Washington, D. C., has just completed the 1925 issue of Tide Tables. It contains tables for the use of mariners, indicating predicted tides for various ports of the United States and foreign countries.

Helical Gears are described in a leaflet issued by the **De Laval Steam Turbine Co.**, Trenton, N. J.

Standard speed motors are less expensive than special motors, and more efficient than slow speed motors. In the case of induction motors they also have a higher power factor. The saving on the cost of a special motor helps pay for the speed converter, while the saving of power due to higher motor efficiency usually exceeds the loss in friction in the speed reducer. This is particularly true if the latter consists of helical gears, which have efficiencies in excess of 98 per cent. Helical gears are used for ratios up to approximately 6 to 1, worm reduction gears being used for larger ratios. They are also used for speeding up, as in driving centrifugal air compressors, centrifugal pumps, homogenizers, small pulverizers, etc. Helical gears are noiseless and smooth-running, as several teeth are at all times in contact.

The exceptionally economical Fairmount Pumping Station at Cleveland is described in a pamphlet just issued by the **De Laval Steam Turbine Co.** of Trenton, N. J. This station contains eight geared turbine driven centrifugal pumps, each delivering from 20 to 75 million gallons per day against heads varying from 86 to 400 ft. The same units also supply large quantities of bled steam at pressures of 3 to 125 pounds per square inch for heating municipal buildings, residences and business blocks, as well as the filtration buildings and the pumping station.

Before selecting the type of prime mover to be used, an extensive survey of the economies to be expected from different types of prime movers was made by L. A. Quayle, chief mechanical engineer of the Department of Public Utilities. The present pamphlet outlines the methods and results of this investigation, describes briefly the type of unit which was finally selected and gives the results of tests made thereon.

As the type of turbine and the method of operation employed at Fairmount are closely similar to those which would be used in any manufacturing plant where low or moderate pressure steam is required for heating or processing, the pamphlet should have general interest.

New Electro-Hydraulic Steering Gear

A NEW development in electro-hydraulic steering gears that gives them a flexibility of location unequalled by any other type is illustrated in the accompanying photograph of a steerer built by the American Engineering Company, of Philadelphia. This steerer can be placed anywhere aboard ship, wherever space is available, making electro-hydraulic steering practicable for any vessel. Successful installations already have been made in the tugs Wm. A. Lydon and Edwards.

The economy, ease of control and adaptability to space conditions that characterize electro-hydraulic steering gears have won general recognition, but there have been certain types of craft to which, in the past, it could not be readily adapted. Until recently, two standard layouts have been used. These are the tiller type with athwartship rams, the tiller being keyed to the rudder stock and actuated by the rams through a swivelled trunnion, and the parallel or duplex ram type, which swings the rudder crosshead through links, as in the screw gear steerer, or by sliding blocks in the crosshead (known as the Rabson slide) or by direct connection to rams operated by oscillating cylinders.

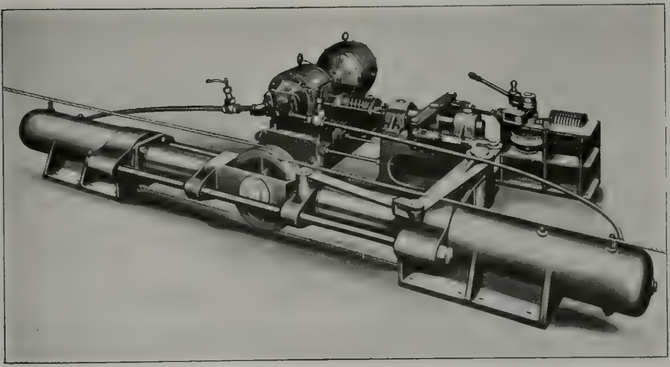
The average large ship has sufficient beam at the rudder stock to use the opposed ram type. Some have two rams with tiller, while others have four rams with crosshead. On ships with finer lines aft the duplex ram type has been used because of lack of width athwartship.

With any of these layouts, the gear is nested about the rudder-post, none of them being capable of installation at remote points. In the case of smaller craft such as tugs and yachts, particularly those already built and to be changed over to diesel or diesel-electric, it often happens that there is no space available in the lazarette for hooking up direct to the rudder post.

It was to meet this condition that the American Engineering Company devised and built the gear shown in the cut. It may be installed anywhere aboard ship, laid down on deck or hung up on a bulkhead, with driving unit and controls stepped down and nested beneath, either athwartship or fore and aft, retaining all the characteristic features and advantages of the direct-connected electro-hydraulic gear without its limitations.

The rams actuate a pair of wire rope sheaves. The cables are lashed to the under side of the cylinders and pass over and around the sheaves to port and starboard, thence through quarter blocks, etc., to the standard type of quadrant on the rudder stock. If direct connected without purchase in the line, this arrangement, on account of the inverse purchase obtained, would require twice the power of the other types, making an oversize installation necessary. This, however, is avoided and size kept down to correspond with that required when the older layouts are used by one of two means: either the quadrant radius is increased, or, preferably, a sliding block purchase is placed in the line between the gear and the quadrant.

Transmission may be of any selective type, as with the other gears, wire rope, shafting or telemotor all being suitable for this purpose. The follow-up mechanism is part of the gear proper and its operation does not require remote connections aft to the rudder stock.



The new electro-hydraulic steering gear recently developed by the American Engineering Company of Philadelphia.

Electrically Operated Holystone

ALL floors and all decks which are floors afloat present three tasks or problems to the individual who uses them. In order to be satisfactory they must be made smooth to the foot and pleasant to the eye, and they must be kept clean. To the housewife, the charwoman, the able-bodied seaman, these tasks have until a recent period been among the most tedious, toilsome, and disagreeable of all jobs entering into the complex which we call civilization.

Particularly in the case of the A. B. has the cleaning of decks been held in aversion and especially so because this task was often used as a punishment by nervous skippers in dealing out unjust sentences on the unlucky Jack. Holystoning the deck became almost as obnoxious as K. P. duty in the army or the rock pile in the jail.

Today electricity has come to the rescue of our deck hands, and the modern passenger liner is replacing the old holystone with electric holystone or deck scouring machines. This device, developed through fourteen years' experience by Ponsell International, has found a very useful place on many large passenger vessels. The Leviathan, several of the President liners, and other large American floating hotels are Ponsell equipped.

The Ponsell electric holystone, which is displacing hand labor on many passenger liners.

The machine consists of a high class enclosed navy type motor driving a horizontal disc to the underside of which are fastened blocks of grinding stone making an ideal deck stoning arrangement. Brushes or other devices can be substituted for the stones, and the same machine used for scrubbing or polishing the lounge, dining saloon, or dancing saloon floors, or for many other purposes.

A Ponsell office is maintained at San Francisco, 525 Market Street, with R. V. Cornell as sales manager.

Bridgeport Brass Company announces the removal of their New York office on July 24 from the Pershing Square Building to the Farmers' Loan and Trust Building, Suite 407, 475 Fifth Avenue at Forty-first Street.

Hough & Egbert, well known naval architects and marine engineers, with office at 519 Robert Dollar Building, San Francisco, have recently been appointed representatives of the Bridgeport Brass Company for the San Francisco district.

An Efficient Gasoline Driven Hoist

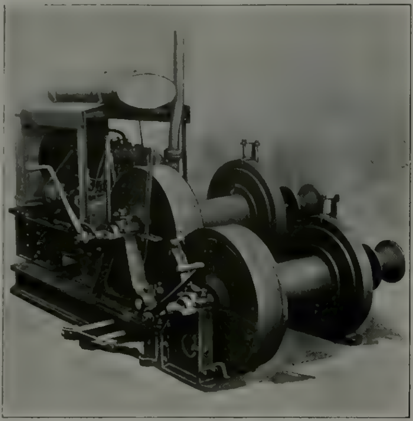
THE American Hoist & Derrick Co. of Saint Paul, Minnesota, has recently redesigned its gasoline hoist, changing it from chain drive to gear drive.

The new hoists are driven by means of spur and bevel gears with an intermediate longitudinal shaft placed at right angles with the pinion shaft, which is the crank shaft on a steam hoist, the gasoline motor being mounted lengthwise instead of crosswise on the hoist.

The pinion shaft of the hoist has a bevel gear near its center which engages with a bevel pinion on the end of the intermediate longitudinal shaft. On the other end of this shaft there is a spur gear which engages with the pinion on the engine crank shaft. The intermediate shaft is mounted at nearly the center lengthwise of the bed and is supported by heavy babbitted boxes.

One of the accompanying illustrations clearly shows the gear drive arrangement with the gear guard and drums removed.

Equipped gasoline hoists with gear drive instead of chain drive gives a number of important advantages among which are speedier shipment of both hoist and driving mechanism repairs and ability to change the line speed to meet varying requirements without seriously delaying shipment. However, the principal advantage of the new gear drive over the old chain drive is that power is transmitted directly to the pinion shaft of the hoist which is between the two rear drums and from there to the friction gears by at least two teeth, one to each adjoining friction gear, whereas on the old arrangement power was transmitted to the rear drum and from there to the rest of the drums by only one gear tooth.


View showing arrangement of engine, radiator, and drums for the American gasoline engine, gear driven hoist.

The entire hoist is mounted on a cast iron bed plate, insuring rigidity and absolute alignment of gearing, shafting and bearings. The gasoline engine is mounted on the bed plate in place of the boiler or electric motor and the hoist is very compact and self contained.

It has the drum equipment of the regular American steam hoisting engine. This means that by means of the hoist unit system you need not buy a hoist with a greater number of drums than your present requirements call for, as future growing requirements can be taken care by bolting one additional drum at a time to the front of the hoist.

Some of the general advantages of gasoline hoists are that they combine the cleanliness of the electric hoist with greater portability. They can be used where electric power is not available, where the water supply is unsuitable for use in steam boilers, or where there is no boiler water at all. Their use is permissible where steam hoists are not allowed; for instance, in and around buildings where the architect will not allow steam boilers. Furthermore, a licensed engineer is not required.

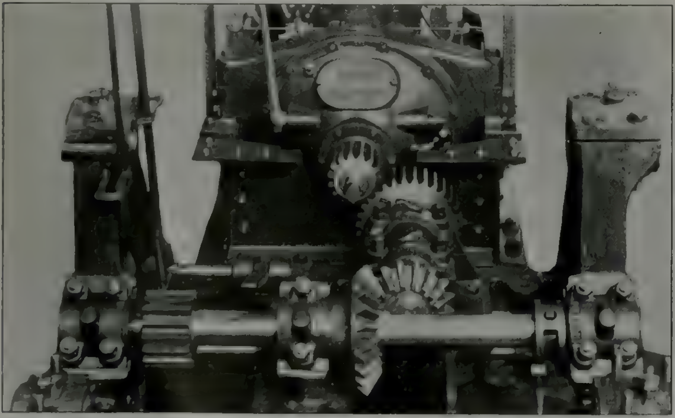
Combination Welder and Compressor

A COMBINATION air compressor and arc welder driven by a gas engine and mounted on a single base has been placed on the market by Schramm, Inc., of West Chester, Pennsylvania. The outfit consists of a Buda gasoline engine, a Schramm compressor and a General Electric welding outfit. The complete equipment may be mounted on a standard two-ton truck or can be made portable by adding steel or rubber-tired wheels.

The Buda engine is a 24-horsepower, 800 r. p. m. unit which may be started and operated independently of either the compressor or welding generator. The Schramm compressor is a two-cylinder, water cooled machine with a capacity of 120 cubic feet per minute and equipped with an automatic unloading device. The air receiver is 16 inches in diameter by 42 inches high. The General Electric welding equipment consists of a belt-driven WD-12 arc welder with an idler pulley for belt tightening. By the use of a Borg & Beck 12-inch clutch coupling, either of the machines may be connected to the engine.

This combination outfit is expected to be of great value in field work. The air compressor can be used to operate drills, grinders and chipping hammers for cutting, peening, caulking and cleaning off scale. The compressor can also be used in preparing work for welding. With the G-E WD 12 welder, light and heavy gauge steel can be welded as well as cast iron. After the welding is completed, the compressor clutch is thrown and the weld can be ground or chipped as desired. Thus a complete job can be done with the single machine.

The structural steel base is 8 feet 4 inches long, 5 feet 11 inches wide. The outfit is 3 feet 10 inches high. The total net weight of the outfit is 4000 pounds.


Gear transmission with covers removed showing pinion shaft and intermediate shaft of the new American gear-driven hoist.

The Coast Guard Motorboat Timgard

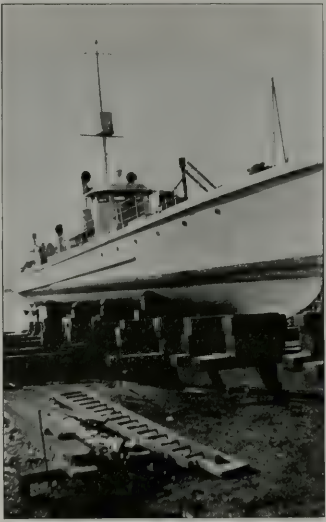
THE successful use of former sub-chasers as commercial vessels is quite common. Many of these slim lined, speedy boats are in daily operation as fish carriers, as water taxies, as inspection boats for various corporations, and for various government departments. On the Pacific Coast an example of especial interest is found in the U. S. C. G. Timgard which is giving a very good account of herself as a rum-runner chaser.

When this former submarine eliminator was taken over by the Coast Guard Service, she was overhauled and a new power plant installed under the careful supervision of Commander W. E. Maccoun. The work was done at the Crowley Shipyards, Oakland, Califorina. Two 100-horsepower Winton, Model 105, full diesel engines were substituted for the old power plant. These engines are 6-cylinder, 6½-inch diameter by 8-inch stroke, and deliver their rated capacity at 600 revolutions a minute. On the test block at the Winton plant the engines gave speed and horsepower results as follows:

Horsepower	Revolutions Per Minute
51	300
68	400
89	500
102	600
119	700

Propellers were especially designed for the characteristics of hull and engines by the Cloverleaf Propeller Company of San Francisco, the specification by the Coast Guard Service calling for 10½ knots at 600 revolutions.

When the boat was ready an official trial trip was held on San Francisco Bay under charge of Commander Maccoun. A naval officer was in charge of the deck. The Cloverleaf Propeller Company was represented by James B. Simpson, and the Crowley shipyard by their engineer, E. Storm. The following results were obtained: Revolutions per minute, port engine, 620; starboard engine, 607; average speed, 11.8 knots or 13.5 miles an hour.



The Timgard on the ways of Crowley's Shipyard, Oakland, showing one of her Cloverleaf propellers.

Commander Maccoun was much pleased with this result, giving more than 10 per cent speed above requirements at the rated capacity of the engines and allowing ample overload capacity for spurts. The Timgard is considered one of the best vessels in the Coast Guard rum chaser fleet.

Westinghouse Power for Radio Beacons

THE small light and power plant was originally designed to supply light to farm houses, barns and yards and supply power to operate the various small farm machines. Since its inception for use in supplying light and power to the farm, it has branched out, so that now its applications are numerous and various.

The most recent innovation in the field of the small power plant is one that is extremely important and yet is novel and unique. At most of the dangerous points in the various navigable waters of the United States, the government has installed a safe and accurate plan for determining the location of the ships which pass by the various lighthouses. This is accomplished by means of radio fog signals, which are operated by electrical energy, supplied by light and power plants, manufactured by the Westinghouse Electric and Manufacturing Company.

In order to insure against failure of these fog signals and consequently against serious ship wrecks which might result from such failures, it is essential that these power plants be rugged and sturdy and operate under the most adverse conditions. For this reason the type chosen has a three h. p., four cycle, single cylinder, valve-in-head, air cooled engine, with a rating of 1½ kw. and 110 volts. It operates at 1200 r. p. m. on kerosene or natural gas, and has a six gallon fuel tank in the engine base. The control box is bolted to a generator frame with all five parts enclosed to protect the operator. The battery equipment in the plant consisted of 56 cells. The lighthouse keeper merely has to press a switch to start the plant in operation.

These light and power plants are now being installed at such points as the Galveston Jetty, at Galveston, Texas, San Francisco Harbor, Detroit River Lighthouse in Michigan, Cape Spencer Lighthouse, Alaska, Buffalo Lighthouse, N. Y., and others making up a total of forty-six in all.

Trade Literature

Marine Oil Engines for Direct and Electric Drive, is the title of a new publication just issued by the Ingersoll-Rand Company, 11 Broadway, New York City.

The publication, which is attractively printed in two colors, contains more than 30 interesting illustrations featuring the single acting, direct injection, 4 cycle engine for direct-connected and electric driven motorships.

The single-lever-controlled reversing engines for direct-connected drive, are illustrated by engine room views of the ferryboat Hudson - Athens, tugs Grace, Sonittep, Hustler, Robert C. Bonham, and the towboat Seba.

The non-reversing engines for oil-electric drive, with pilot house control, are represented by views of the J. W. Van Dyke, the largest oil-electric tanker under the American flag, and the Van Dyke 1, 2, and 3, the first oil-electric tugs to be used in coastwise towing. The oil-electric tanker Brilliant is featured on the front cover.

A copy of "Marine Oil Engines for Direct and Electric Drive" will be sent upon request by the Ingersoll-Rand Company, 11 Broadway, New York, or any of their offices in the principal cities of the United States and the world.

There has recently come to our desk a very attractive booklet describing the products of the **Stockton Fire Brick Company.** These are fifty-five pages chock full of information for fire brick users.

The Stockton Fire Brick Company owns and operates a refractories plant at Stockton, California, with clay properties at Lincoln and Ione, California. It thus controls the raw product and all the processes of preparation and manufacture. A well equipped laboratory, with expert research engineers, is maintained for constant check on materials and for development of new procesess and products.

A full line of shapes for boiler refractories, cupola and rotary kiln blocks, steel mill and foundry refractories, and runner bricks are described, illustrated, and dimensioned in this handbook. Various ground refractory materials, high temperature cements, and heat insulating brick and plastic fire brick mixtures are also described.

Copies of this interesting booklet may be obtained by addressing John T. Roberts, president, Stockton Fire Brick Company, Rialto Building, San Francisco.

Nelseco Diesel Engines to Be Sold on West Coast

King-Knight Company Appointed Pacific Coast Representatives for New London Ship and Engine Company

RECOGNIZING the necessity of active representation on the Pacific Coast, one of the pioneer manufacturers of diesel engines in this country, the New London Ship & Engine Company, has appointed the King-Knight Company of San Francisco, Los Angeles, and Seattle their representatives on the Pacific Coast for both sales and service. Plans are being completed for the carrying of a complete stock of repair parts and for an active sales campaign on Nelseco engines. The complete success of the new 4-cycle, mechanical injection Nelseco engine upon the East Coast has attracted a great deal of favorable comment and interest among engineers in both the marine and stationary fields, and it is this same engine, which is built in sizes up to 1000 horsepower which will be in greatest demand upon the Pacific Coast. Nelseco engines are also built in the larger sizes up to 6000 horsepower in the 2-cycle, double acting, air injection type.

The New London Ship & Engine Company has been building diesel engines for sixteen years under license from M. A. N., the largest engine builders in the world and original pioneers of the diesel engine, working together with its inventor, Dr. Diesel. Since obtaining its license in 1910 more than 250,000 hosepower in diesel engines has been turned out by Nelseco, while M. A. N. has manufactured more than 1,500,000 horsepower. As the original licensees of M. A. N. in this country, Nelseco built the first marine diesel engine in America, made the first diesel-electric drive installation, and has built more horsepower in marine diesel engines than any other manufacturer in this country.

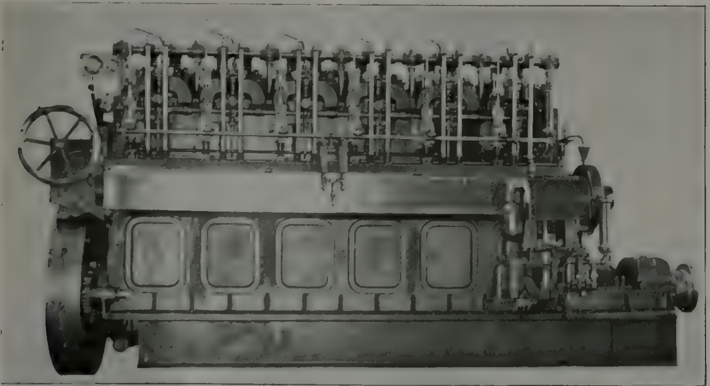
Feeling the need for a more efficient engine in the smaller sizes, this company, in collaboration with M. A. N., studied the existing systems of mechanical injection, to get away from the operating troubles existent in, and the losses incurred by, the air compressor required by the air injection engine. Not finding their idea of perfection in any of the existing systems of mechanical injection, M. A. N. and Nelseco developed their own system which has resulted in greater economies than ever before attained in fuel consumption and operating expenses. With the Nelseco-M. A. N. type of mechanical injection a fuel injection pump is operated off of the cam shaft opposite each cylinder, so that each cylinder has its own fuel injection pump and the line to the cylinder is under pressure only at the time of the introduction of the oil, which is accomplished in the form of a highly atomized spray resulting in clean combustion and a clear exhaust.

A rectangular cylinder block construction is used, since with this type of construction the strains due to combustion are taken by the entire block rather than being imposed upon a single cylinder as is the case when individual cylinder castings are used. With this block type of construction cylinder liners are used. These liners are machined on both sides, thus equalizing strains due to the even thickness of the cylinder walls and allowing a more perfect water circulation. Cylinder replacements are simple and far less expensive, which naturally results in lower maintenance costs when after a number of years the cylinder wear has reached a point where reboring or replacement is necessary. The cylinder head is of patented design, so arranged that the velocity of the cooling water is greatest at the points of greatest heat, resulting in a more even temperature being maintained in the cylinder head, thus removing one of the greatest causes of cracked cylinder heads.

Steel tie bolts are used to tie the cylinder block, housing, and bed plate together under a compression strain and these bolts tend to transmit the forces reacting from the cylinder heads directly to the main bearings and crankshaft. Exhaust and intake valves are in cages and are interchangeable. Owning as it does its own foundry and forge shop, Nelseco engineers are able to follow the complete construction of their engines from the raw materials to the finished product, maintaining strict supervision upon all parts which go into the engines.

This, briefly, is a description of some of the outstanding features of the Nelseco mechanical injection engine which has received so much favorable comment. The design has been worked out to give maximum simplicity and accessibility to the operator, together with the utmost reliability, the accessibility helping to cut down operating expenses by reducing to a minimum the time lost for overhauling and the necessary periodic inspections.

The Electric Ferries of New York selected Nelseco engines for the six new diesel-electric ferries which they have under construction at the present time, each boat being equipped with two 450-horsepower, 4-cycle, mechanical injection engines. Two of these engines were shipped from the Nelseco factory on August 7, just seventy days after the signing of the contract, to the American Brown-Boveri Electric Corporation, who are fabricating the hulls for these ferries. The remaining engines will be delivered on time or ahead of schedule, which speaks well for the organization of the New London Ship & Engine Company.



Operating side of the 6-cylinder, mechanical injection Nelseco diesel engine. This is the direct reversible type of engine and develops 300-350 shaft horsepower at 260-280 revolutions per minute.

A Historical Sketch of Bridgeport Brass Company—1865-1925. The history of the Bridgeport Brass Company closely parallels the industrial history of this country from 1865 to 1925, and this history is written in very interesting and entertaining style by A. D. Guion as printed originally in "The Metal Industry," and later reprinted for distribution by the company.

A number of interesting "advs." are also reproduced in this booklet, depicting the various services to which Bridgeport brass has been employed in its history. The story follows the formation and early history of the company, The Operations in the Sheet Mill, by Donald C. Root, sales engineer; Industrial Relations Work of the Company, by C. F. Dietz, president; and Brass Manufacturing Progress, by W. R. Clark, general works manager. Copies of this interesting booklet may be obtained from the company.

Cutting Costs at Marine Terminals, II

By Harold J. Payne, Society for Electrical Development.

LAST month's installment of this article recited the experience of a New York steamship company pioneering the use of electrical trucks on their terminal. This installment gives specific data on costs.

The attitude of labor is ordinarily held to be an argument against the installation of power equipment for doing stevedoring work. It is true that when large fleets have been put into service overnight considerable feeling has arisen in a few cases. But when fleets have been built up gradually the men have had an opportunity to discover for themselves that the power truck makes their work lighter and consequently more desirable. One executive reports that "when any of our power units are out of commission now the men seem to lose heart and evidently appreciate what the equipment means to them." The fact that such a large number of the companies operating terminal properties on the waterfront of New York have been successful in the installation of storage battery trucks is conclusive evidence that labor respects these machines.

Further Data On Costs.

It may be held that such a cost figure as that given above can hardly be regarded as conclusive because of the wide variation in conditions from one point to another. For that reason the figures compiled by another terminal company operating in the metropolitan area of New York City become significant. This concern handles cargoes of all kinds between bulkhead and railroad cars, bulkhead and adjacent warehouses, and between bulkhead and bulkhead. A varied fleet has been built up including all types of equipment except the elevating platform truck.

The costs that follow include interest on investment, insurance, depreciation, maintenance, power, garaging, and all incidentals. They are based in every case on accurate data, obtained at considerable expense.

The old method, two men to a bale, hard work.

Type of Equipment	Idle Time Hourly Cost	Working Time Hourly Cost
Heavy tractor (highway)	$0.37	$0.80
Industrial tractor	Never idle	.43
High lift truck	.31	.43
Two ton low platform (A)*	.23	.46
Two ton low platform (B)*	.24	.49
Crane truck (1 ton)	.41	.78
Crane truck (2 ton)	.22	.64

*Competing makes of same machine.

Without going into detail in citing the savings effected in handling various commodities, it is worth while to indicate what a single unit of this equipment is accomplishing. The high lift truck is used mainly between bulkhead and freight cars, loading directly by this means. Carrying burlap bales, 15 to 18 tons are handled per hour, the distance covered being from 50 to 300 feet. By hand the known cost of this handling is 55 cents a ton. By truck the cost is 36 cents a ton, including all truck and labor charges. The net hourly earning in this service, which represents a fair average for the various kinds of merchandise carried, amounts to $2.85. This works out to $22.80 a day or $6840 a year. In other words, after paying all carrying and maintenance charges, this truck is annually returning roughly 300 per cent on original investment.

Large Terminal Uses Tractors.

The International Mercantile Marine Company, which operates such lines as the American Line, the White Star Line, the Red Star Line, the Leyland Line, the Atlantic Transport Line, and the Panama Pacific Line, has been using storage battery equipment since 1914 and according to John Watson, pier superintendent of the company in New York, has found the methods made possible through its use distinctly worth while. The work done consists of transferring cargo from one ship to another and, so far as possible, is conducted on the upper level of the piers in order to avoid the necessity of lowering sling loads to the street level.

By the old system a four-wheel flat bed truck carrying an average load of one ton required four men for handling, three pushing the load and one guiding it. At present one of the fleet of ten tractors in use picks up as many as seven or eight such trailer loads in one string and makes a trip in a fraction of the time formerly required. The hauls frequently run several hundred feet in transfer from

Modern terminal practice, one man and an electric truck handling 21 bales.

one pier to another, and naturally in this work the conservation in man power through the use of the electric tractors is distinctly felt. It has been found by test that each tractor in use earns the wages of seven stevedores. On the waterfront of Manhattan the hourly rate paid this help for day work up to eight hours is 80 cents, above eight hours the rate is once and a half this figure.

Maintaining Daily Schedule.

Concerns maintaining combined passenger and freight service with ships sailing daily depend, to an increasing extent, upon storage battery trucks and tractors for the speed of handling needed in order to maintain schedules. Included in this list are the New England Steamship Line, the Hudson Navigation Company; the Eastern Steamship Lines, and the Central Hudson Steamboat Company. The last concern has developed the novel practice of maintaining tractors as part of the boat's equipment—where the boat goes the tractor goes. Charging equipment is maintained on board. In this way the advantages of power for loading and unloading at points where the volume handled is relatively small are regularly realized.

At a New England terminal of one of these lines a fleet of 5 tractors is in use that for several years have consistently demonstrated a net earning of $5000 apiece over the best practice that it had previously been possible to devise using hand trucks exclusively. In the pier shed at this point there are two railroad tracks on which cars are so spotted that both trains can be worked at the same time. Before tractors and trailers were installed it cost from 74 to 78 cents a ton to transfer freight from train to boat or vice versa. At present the cost does not exceed 50 cents a ton. The figures in both cases represent a total in which all overhead is figured. Labor at that point earns 60 cents an hour. It is evident, therefore, that every worker averages to handle better than 1.2 tons per hour. Moreover this cost is maintained in the face of difficult working conditions. Frequently from 10 to 18 carloads of freight are received at the pier shed an hour before sailing time of the boat. This means that the handlers are frequently comparatively idle for several hours during the middle of the day. The figures given, however, are on the basis of over-all performance.

Satisfied Users.

An investigation carried on at random points has turned up the facts given above. The list of known users, aside from manufacturing plants and exclusively warehousing concerns that happen to be on the waterfront of New York, includes the following:

View at a terminal showing comparison between the old hand truck and the modern electric lift truck using the platform system.

American Dock Company; American-Hawaiian Steamship Company; Barber Steamship Co.; Booth Steamship Company; Bull Steamship Company; Bush Terminal Company; Carter & Weeks; Central Hudson Steamboat Company; Central Railroad of New Jersey; Central Vermont Railway; Clyde Steamship Company; Cunard Steamship Company; D. L. & W. Railroad Company; Eastern Steamship Company; Erie Railroad; French Line; Furness Withy & Company; Hudson Navigaton Company; International Mercantile Marine Co.; Kerr Steamship Company; Lehigh Valley Railroad; Long Island Railroad; Luckenback Steamship Company; New York Central Railroad; New York Dock Company; New York, New Haven & Hartford R. R.; New York State Barge Canal; New England Steamship Company; Ocean Steamship Company; Old Dominion Line; Panama Railroad Steamship Company; Pennsylvania Railroad; Richmond-New York Steamship Company; Southern Pacific Steamship Company; Turner Blanchard Company; U. S. Railway Mail Service; U. S. Shipping Board; Ellerman Wilson Line; Hoboken Shore Railroad; Holland America Line; U. S. Line.

It is a matter of record that when the first telegraph wires were strung they were cut, that when the first sewing machine was built it was smashed, that when the ties for the first railroad were laid they were torn up, that when Faraday discovered the principle underlying the construction of the modern electric motor he was laughed at. Prejudice against new developments, whatever their nature, is deep rooted and general. Only when economic issues combine to force sentiment aside can constructive action be anticipated. With industrial electric truck and tractor equipment, as with much other apparatus in the same general class, increasingly general acceptance, profitable though it is certain to be, may be expected to come largely through the breaking down of preconceived ideas, a breaking down that is forced by an increasingly difficult labor situation.

Back Gears for G-E Motors

A BACK geared attachment designed to operate under the most unfavorable conditions is announced by the General Electric Company for use with its "500 series" induction motors. This attachment is of unusually strong construction and is easily installed and easily adjusted.

The base, to which the motor and back shaft pedestals are bolted and doweled, is a single, large casting. A special unit-type pedestal is used, one casting forming the housings for the large back shaft bearings. Thus maximum rigidity and permanent, correct alignment of shafts and meshing of gear and pinion are assured.

The back shaft is provided with shoulders to limit end play and is made of special steel. It is supported by two extra large, double-seated, split bearings in dust-proof housings, holding oil sufficient for a number of months' operation.

A split gear case, fabricated from steel plates, protects the gear and pinion from dust and retains the grease or oil in which the gear runs. Two standard gear ratios are available. Steel or fabroil pinions with cast iron gears may be used. Two box type welded rails with an easy adjusting feature complete the equipment.

Trade Literature

Industrial Control Catalog, 1925-1926, has been issued by the **General Electric Company,** Schenectady, N. Y.

This publication furnishes information on representative lines of industrial control manufactured by the General Electric Company. It includes a reprint of the industrial control section of the General Catalog; instructive matter on the care and operation of control devices; wiring diagrams of some standard controllers, push-buttons and other accessories; reference tables; lists of publications; and other information. A complete subject index is embodied in the book, also an index classifying the general purpose starters.

Marine Insurance

Edited by JAMES A. QUINBY

Subsidizing Self Insurance?

GENERAL average is an institution whose ramifications are marked with such technical subtleties that we are not surprised, now and again, when its machinery gives forth a dolorous creak. The latest potential rift in the lute among our Pacific Coast marine fraternity has to do with the custom of waiving general average security on intercoastal shipments, and allowing uninsured cargo to escape contribution.

To understand the effect which this practice has upon the situation, we must remember that the law of general average imposes a duty upon all parties to the venture to contribute rateably to those expenses undertaken to save that venture from harm and bring it to a successful conclusion. Up till a few years ago, it was customary to follow the doctrine rigidly, exacting security from each and every parcel of cargo to insure its contribution.

Heavy Weather

Erny Laidlaw, he of the sandy tresses (count 'em) and the freckles (count 'em if you can), contributes the following deep-sea chantey, which he stoutly denies has any personal color as a true confession. We threatened to pull a Jack Kearns with it, and sub-title it "The Shipping Game from the Inside."

The good ship Tidy Adely has crossed Columbia Bar,
She's slanting down the latitudes to British ports afar.
The Tidy Adely's rusty and her decks are none too good,
But she never spoils a cargo—'tis a thing well understood.
Cho.
Oh, it's "Keep your log well written up. Use phrases such as these,
"Rolling most tremendous, an' shipping heavy seas."
(Never mind if every sea comes from a wash-deck bucket,
A proper phrase in protests saves owners many a ducat.)
Adjusters they can worry, the underwriter pays;
"Sea peril" is a handy thing in these here hungry days.
So let your up-keep go to hell, but keep your log-book straight,
An' the good ship Tidy Adely has no claims come off her freight.

With the rise of our great intercoastal trade, however, adjusters were forced to deal with large carriers, loaded with miscellaneous general cargo under bills of lading whose number often ran into the thousands. The expense of taking security and obtaining the contributing value in such cases is enormous and becomes prohibitive when the general average column is small.

The adjuster must furnish reams of various blanks, write letters to each and every consignee, interview the consingees and their underwriters, obtain copies of invoices, enter into acrimonious arguments in regard to values, exact deposits from uninsured interests, and explain the entire theory of general average about three times to each of the interested parties mentioned above. When the adjustment affects, say, three thousand separate and distinct parcels of cargo, it may be readily appreciated that this is some job.

And yet the vessel owners could not dispense entirely with the recoupment of losses from this source. Even small adjustments were better than shouldering the loss, provided some way could be found to lower the cost of production.

A Short Cut.

In this dilemma, an enterprising adjuster hit upon the scheme of waiving security entirely, by means of agreements with underwriters, and using insured values, furnished by these same underwriters, in lieu of contributory values. It was argued that the proportion of uninsured intercoastal cargo is small, so the burden upon the insured portion would be but very slightly increased, and the actual contribution payable by any given underwriter would be materially reduced, owing to the greatly lessened costs of adjustment.

This plan was finally adopted, and now, in those intercoastal cases where the expenditures are relatively small, the cargo underwriter is requested to sign an agreement reciting that in order to reduce the expense of adjustment, the taking of security is waived, uninsured interests shall not be required to contribute, and the cargos' contribution shall be apportioned over the insured interests. The underwriter usually agrees, in addition to furnish the adjuster with the insured values of any goods at his risk aboard the vessel.

This insured value is then used as a contributing value. In cases where the insured value is actually obtained, this works no hardship, since practically all goods moving in the intercoastal trade are insured at invoice plus a stated percentage, the total of which approximates the true market value at destination.

After observing the workings of this "short-cut" system for a few seasons, we are of the opinion that in spite of its immediate economy, there are certain objections, if not to its existence, at least to its extention, which should be considered. To specify remedies at this time would be difficult. Perhaps the system itself is essentially sound, and the only fault lies with its operation.

One step in the right direction would be to standardize the agreements now in use by various adjusters, so that the underwriter would not have to go over the thing with a microscope to make sure he is not agreeing to an extention of the voyage or an unwarranted transhipment. A standardized agreement could be printed and issued by the Board of Marine Underwriters and used in the same manner as Institute Cargo Clause and other common forms.

Objections to the System.

The faults of this "short-cut" system, however, apparently go deeper than mere errors of form. From the viewpoint of the cargo underwriter, there are at least three good arguments against it, which we shall set down for what they may be worth.

1. **The system results, in effect, in subsidizing self-insurance at the expense of the underwriter.**

Arthur M. Brown **EDWARD BROWN & SONS** *Arthur M. Brown, Jr.*
MARINE DEPARTMENT—*Harry W. Browne, Manager*
PACIFIC COAST GENERAL AGENTS
THE GLOBE & RUTGERS FIRE INSURANCE CO., INC.
200 BUSH STREET, SAN FRANCISCO

FIREMAN'S FUND
Insures Hulls, Cargoe
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European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Resident Agent for Oreg
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, MANAGER, PACIFIC NORTHWEST BRAN

There are two classes of uninsured cargo on our intercoastal carriers. The first consists of occasional shipments of small value, whose owners either do not know enough or do not care enough, to insure them. The fact that this type of cargo is relieved of its rightful duty to contribute is of little moment, since it probably does not exceed one or two per cent of the value on board.

The second type of uninsured cargo is that belonging to the powerful organization which has its own insurance fund. In short, a man may fail to insure either because he is too little or because he is too big.

When a big man goes free and the cargo underwriters are forced to bear his share, they are being imposed upon.

Frequently the only touch an insurer has with his client occurs through assistance rendered in general average cases. If this client looks about him and finds that the Standard Oil Company, or some other large corporation, pays no contribution, he is very likely to assume—and with some reason—that part of the premium he pays is used to defray charges which should rightfully be assessed against his neighbor. It goes without saying that such an assumption is conducive to joining the army of the uninsured.

II. A system is inefficient which depends upon advices from various underwriters as a basis on which to assess their liability.

This is not a slur upon the honesty of insurers so much as a comment upon their office methods. A small general average may be completed within a month or two after the accident occurs, and the consignee-assured, not having been stirred to activity by the spur of a request for deposit, may have forgotten to declare under his open policy until after the insurer's list has gone to the adjuster.

Or, as in an increasing number of accounts, the insurer may keep bordereaux, but no line sheets, due to the fact that declarations are accepted in a lump sum at the end of the month. In such cases the underwriter can not possibly have an accurate check.

Furthermore, it is but human to expect errors where the only penalty for careless omission is a relief from liability.

Another inaccuracy results from the fact that on the larger inter-coastal fleets, goods are often short shipped and forwarded by a subsequent vessel of the same line, even though a bill-of-lading and a policy have been issued for the original carrier. In such cases, the underwriters' reference to his line-card will be misleading. The natural result of the system is to offer a bonus for carelessness and bring about an artificial inflation of the uninsured proportion.

III. In reality, three interests benefit by the practice, while but one of them—the underwriter—is asked to pay the bill.

The underwriter admittedly benefits, due to the lessened cost of adjustment, but he is not the only party who reaps an advantage.

The shipowner benefits, since he avoids the ill-will which inevitably results from the adjuster's activities in securing contributory values and taking general average security, particularly in those cases where cargo is uninsured. Even before the "short-cut" system was used, shipowners preferred to absorb a small general average, rather than incur the unpleasant results of its adjustment, especially in the intercoastal trade, where competition was, and is, keen.

The adjuster benefits, since the relation of his fee to his expense is far more favorable in cases where no security is taken. To put it another way, if the adjuster added to his normal fee the actual cost of obtaining security and contributory values, he'd never be able to get the case past the adjustment committee. So, dollar for dollar, he makes more money with less effort in those cases where he obtains agreements to waive security, just as he makes easier money in bulk cargo cases than he does in general cargo.

Conclusion.

The "short-cut" system here criticised was undoubtedly evolved in good faith, as an earnest effort to lessen the onerous burden of the small general average. This article is written with a view to opening a trend of thought and discussion as to the good and bad points of the practice, which may lead to constructive suggestions for its improvement.

No Doubt

Now that the case of the West Aleta has held that a little trip to Hamburg is a deviation, and the case of the Tokuyo Maru has held that a deviation is not a deviation, we suppose the carriers will draft another clause in their bills of lading (2 volumes, limp leather binding, with advance sheets quarterly). This clause should include all the dicta in the above cases, on the off chance that some of it might protect somebody from something.

"Tell 'Em Nothing"

AMONG the many mortal foibles which must serve the gods of Olympus in the place of the daily comic strip, we hasten to list the alert state of distrust prevalent among brokers and underwriters. In spite of the fact that their business aims, both as a class and as individuals, are logically such as to draw them together on a basis of common interest, they continue to regard each other with the attitude of watchful caution that might characterize the annual meeting of the Scotch P. I. Association, if there is such a thing.

This is particularly apparent in the reticence displayed by certain officers to divulge information of a routine nature. Underwriting and brokerage firms have been known to object strenuously when average adjusters required invoices or other usual data, on the grounds that this would be giving away their business secrets. The funny thing about this complex is that there is no such thing as a business secret. Every brokerage house on the coast has a pretty accurate record of the business carried by competitors. In many cases the record includes rates and conditions. This general information may be obtained in many ways, and to label the adjuster its chief source is a form of flattery which is both undeserved and unappreciated.

And now, after swinging on the brokers, it is no more

NSURANCE COMPANY
reights and Disbursements
TREETS, SAN FRANCISCO, CALIFORNIA

. H. WOODRUFF, Manager, Southern California Marine Branch
740 SOUTH BROADWAY
LOS ANGELES

CHARLES R. PAGE, Manager
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

9 COLMAN BUILDING, SEATTLE, WASHINGTON

than fair that we should turn around and take a slap at the adjusters. We have heard that some of these gentry have of late shown a coy reluctance in the matter of allowing brokers and underwriters to see the cargo manifests on vessels suffering a general average, their apparent reason being based upon a fear that some enterprising broker or underwriter, after searching the manifest for the names of his clients, will note the name of some consignee who is so misguided as to carry bill of lading insurance, and will immediately bound forth, tail in air and nose to the trail, to run to earth some juicy bit of business before the adjuster's hard worked brokerage department can go and do likewise.

After all, wouldn't it be better for the whole market if everybody involved, including the carriers, discarded this ace-in-the-whole policy and laid their cards on the table?

There is such a thing as an excess of caution, as typified by the New England lawyer who was noted for his unwillingness to commit himself definitely on any subject.

A traveling companion, having received equivocal answers to several questions, finally determined to pin him down to something he couldn't deny. Seeing a sheep in a nearby field, he said, "That's a fine coat of wool that sheep has, isn't it, Morton?"

"We-e-e-e-ll," answered Morton, cautiously, "It looks that way,————from this side."

The jealous, hands-on-your-watch attitude is a relic of the age when ye doughty knight put his silverware and his wife (or somebody's wife) in a nice castle and dared the world to come and get them.

The good old custom of paying 'em close to the vest went out of style about the time of the flowered waistcoat and the onyx cuspidor, but a lot of our leading Rotarians haven't found it out. Just as nations have been rendered inter-dependent by the rapidity of communication and consequent merging of interests, so has the trend of modern business effort been toward a change from the old welter of contending forces to a new concept of cooperation.

In the last analysis, if you can't keep a client except by keeping him in the dark, you probably won't have him long anyway. But if you come square with him, and give him plenty of that good old hackneyed commodity, service, he'll stick to you to the last declaration, even though rates are falling about his ears and your competitors are camping on his doorstep.

Believe It or Not

We read with surprise and pained regret a news item in a daily contemporary saying that during the stranding of the late-lamented Norlina, a considerable quantity of liquor was aboard. The item further alleges that on the approach of insurance representatives, the liquor was hastily dumped overboard. That's what comes of having a reputation.

The Maritime Lien as a Basis of Insurable Interest

MANUFACTURERS of marine engines often furnish their product to a particular vessel or vessels, receiving part payment down and retaining title to the engines as security for the remainder. In many of these sales the boat represents the purchaser's sole asset, and the vendor, in order that his delayed payments may be further protected, is faced with the necessity of taking out marine insurance on the vessel.

If the engine is furnished in this manner to a named vessel, a maritime lien results in favor of the seller, which he may assert to the exclusion of practically all other creditors. This is shown by an interesting decision in the recent case of the Nuska, 1926 A. M. C. 799, in which Fairbanks, Morse & Co. furnished an engine to the Nuska upon the order of her owner, retaining title as security for the unpaid portion of the purchase price.

Later, the vessel owner being in arrears on his payments, Fairbanks, Morse & Co. libeled the Nuska. The owner contended that the retention of title was inconsistent with reliance upon a maritime lien, but the court, in denying this, comments as follows:

"..........One who furnishes repairs, supplies, or other necessaries to a vessel upon the order of its owner has a maritime lien upon such vessel, whether he does or does not allege or prove that he did so on the credit or faith of the vessel.

"In argument in this court, the libel was challenged on the ground that it showed that the appellee retained title to the property which was the subject of written contract alleged. It does not seem that this objection was suggested by the exceptions to the libel. But the libed as a whole was not subject to objection on that ground, because its allegations showed that appellee, upon the order of the boat's owner, furnished to it labor and material the title to which was not shown to have been retained by the appellee.

"Furthermore, the libel showed that the equipment covered by the written contract was furnished by the appellee to the boat on the order of its owner. The retention by contract of the title to such equipment as security for the purchase price was not inconsistent with the existence of the lien given by the statute, and did not prevent the appellee from asserting that lien."

The Opportunity to Insure.

Whenever the facts of a given sale are similar to those in the Nuska, the seller has a valid insurable interest in the vessel, for her destruction would, in most cases deprive him of his only tangible means of securing his future payments.

The English Marine Insurance Act, Sec. 5, reads as follows:

"(1) Subject to the provisions of this Act, every person has an insurable interest who is interested in a marine adventure.

Balfour, Guthrie & Company

(Established 1869)

MARINE INSURANCE

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THAMES & MERSEY
Marine Insurance Co., Ltd.

LIVERPOOL & LONDON & GLOBE
Insurance Co., Ltd.
(Marine Department)

HARTFORD
Fire Insurance Co., Ltd.
(Marine Department)

CANTON
Insurance Office, Ltd.

LOUIS ROSENTHAL
General Agent
302 California Street

JOHNSON & HIGGINS

INSURANCE BROKERS
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ROY C. WARD GEO. B. DINSMORE WILFRED PAGE
GEO. E. BILLINGS COMPANY
308-12 CALIFORNIA STREET, SAN FRANCISCO. DOUBLAS 6400
INSURANCE
BROKERS FOR THE ASSURED—AVERAGE ADJUSTERS

"(2) In particular a person is interested in a marine adventure where he stands in any legal or equitable relation to the adventure or to any insurable property at risk therein, in consequence of which he may benefit by the safety or due arrival of insured property, or may be prejudiced by its loss, or by damage thereto, or by the detention thereof, or may incur liability in respect thereof."

Contrasting Set of Facts.

In the case of the Defiance, 1925 A. M. C. 56, Fairbanks, Morse & Co. also furnished an engine, retaining title to secure an unpaid balance, but in this instance the written contract between the parties made no mention of the vessel, nor in fact, did it so much as refer to the use for which the engine was intended. Delivery, actual as well as that agreed upon in the contract, was to be f. o. b. cars, Baltimore, so there was no inference raised by delivery to the vessel's side.

The Fairbanks people endeavored to introduce parole evidence showing that they had originally known the engine was destined for the Defiance, but this evidence was not allowed, and the District Court (North Carolina) proceeded to hold that as the transportation had been undertaken on the personal credit of the purchaser rather than in reliance upon a claim against a boat, no maritime lien existed.

Does This Negative an Insurable Interest?

If in the Defiance case the vendors of the engine were allowed no lien upon the vessel, it might conceivably be held that they had no right to insure her. Certainly the denial of a maritime lien negatives the idea that the Fairbanks firm were so interested in the property that they would benefit by its safety or suffer prejudice by its loss.

This leads to the conclusion that even had a policy been taken out, collection under it could not have been legally enforced had the Defiance been lost by perils insured against. In the case of the Nuska, however, a policy taken out by Fairbanks, Morse & Co. to cover their delayed payments would have been perfectly valid.

These cases indicate that it behooves marine engine companies and their insurance advisers to work for a standardization of sales contracts, so that it may always be affirmatively shown that the seller relied upon a sale to a particular vessel and not upon the credit of an individual.

Freights, Charters, Sales

August 16, 1926.

THE wheat demand for United Kingdom is not brisk. Charters have been made for September/October/ November at 30/- to 31/3. There was quite active booking for wheat to Japan and liners obtained $4.20, with cargoes fixed at $4 to $4.10.

The Japan lumber market is quiet with parcels and cargoes being placed at $9 to $9.50. Australian lumber charterers paid $13 net for Aug. tonnage, but for Oct./Nov. are bidding $12.50, less 5%. The liners are taking care of the requirements for the West Coast of South America at $13. The intercoastal rates have improved owing to general cargo at this season taking up a good proportion of the space and the rate is now $13.

The following fixtures are reported for grain to the U. K./Continent: British s.s. General Botha, Aug. Balfour Guthrie & Co.; British s.s. Peterton, same; British s.s. Trevethoe, Aug/Sept., Kerr Gifford & Co.; Belgian s.s. Burgandier, Aug./Sept., Strauss & Co.; Swedish m.s. Oxelosund (substitute for Lulea), 30/-, Sept./Oct., Kerr Gifford & Co.; Japanese s. 30/6, Sept/Oct, Balfour Guthrie & Co.; British s. Artemisia (substitute Sithonia) 30/-, Aug/Sept., Strauss & Co.; British m.s. King Malcolm, Sept. Balfour Guthrie & Co.; Swedish s. Lygnern, 30/-, Sept.; British m.s. Westmoor, Sept.

Following are fixtures reported for grain to the Orient: Japanese s. Keifuku Maru, Yokohama-Kobe range, Aug.; Japanese s. Yomei Maru, Shanghai, Sept. Mitsubishi, Ltd.; Japanese s. France Maru, Japan, Sept. Suzuki & Co.; Japanese s. Koshin Maru, Yokohama, Sept.

The British s. General Smuts is reported fixed with lumber from Columbia River to Melbourne, Aug., Balfour Guthrie & Co. and the British s. Cragness from the North Pacific to Australia, $13. Aug., American Trading Co.

The following fixtures are reported for lumber to the Orient: Japanese s. Havre Maru, lump sum, Yamashita Co.; Japanese s. Kohnan Maru, same charterers; Japanese s. Kohshun Maru, Aug., North Pacific Shipping Co.; Japanese s. Yayoi Maru, Sept.; Japan-

(Continued on Page 17, Advertising Section)

Phoenix Insurance Co.
of Hartford, Conn.
Great American Insurance Co.
G. L. West, Manager
Pacific Marine Dept.
233 Sansome Street
Phone: Davenport 3680.
San Francisco.
BRANCH OFFICES:
Seattle: Dexter Horton Building
Portland, Railway Exchange Building.
Los Angeles: Merchants Nat'l Bank Bldg.

Marsh & McLennan
INSURANCE BROKERS
— and —
AVERAGE ADJUSTERS
114 SANSOME STREET
SAN FRANCISCO

MARINE DEPARTMENT
J. B. F. Davis & Son
Standard Marine Insurance Co.
National Union Fire Ins. Co.
Mercantile Insurance Co.
of America
240 SANSOME STREET
SAN FRANCISCO :: CALIFORNIA

Phoenix Assurance Co., Ltd.
of London
Union Marine Ins. Co., Ltd.
Norwich Union Fire Ins. Society, Ltd.
British & Federal Fire Underwriters
PACIFIC COAST BRANCH
(Marine Department)
114 SANSOME STREET
Phone Douglas 6313

Personals and Items of Interest

The appointment of **R. J. Tiedeken** as raw material salesman in the Philadelphia territory is announced by the **Bridgeport Brass Company** of Bridgeport, Connecticut.

Mr. Tiedeken is familiar with the manufacture and sale of brass goods, having been initiated into the business in 1903, at which time he became employed by the A. P. Swoyer Company, with whom he stayed in various capacities until 1921. Later he joined the U. T. Hungerford Company, also manufacturers of brass and copper products, representing them in Philadelphia for a short period. After leaving them, he became connected with the Carey-McFall Company, with whom he stayed until joining the Bridgeport Brass Company.

Mr. Tiedeken will make his headquarters at the Philadelphia office of the Bridgeport Brass Company, which is located in the Bankers Trust Building.

The **Shipping Board** has adopted the policy of requiring a minimum of ten per cent cash on ships sold from the laid-up fleet, and balance over a period of ten years, instead of the previous requirement of twenty-five per cent cash, balance in ten equal annual payments.

They have also adopted a policy that hereafter all buyers, unless the terms of sale provide otherwise, be charged for inventory items according to standard lists now in course of preparation.

Charles J. Murray has recently resigned from staff of **The Linde Air Products Company**, to become associated with the Oklahoma Contracting Company. He is now organizing a new division of that concern to engage exclusively in oxwelded pipe line construction. During his association with the Linde Company, Mr. Murray specialized in this class of work and has studied the construction problems connected with a large number of notable trunk line projects.

L. J. Belnap was recently elected president of the **Worthington Pump and Machinery Corporation** following a meeting of the board of directors.

C. Phillip Coleman, retiring president was elected chairman of the board.

Mr. Belnap was formerly president of Rolls Royce of America and chairman of Wills St. Claire Company of Detroit.

The U. S. S. California, one of the six electric battleships in the United States Navy, has been awarded the battle efficiency pennant for the year 1925-26, according to word received by the General Electric Company, manufacturers of the electrical equipment. This pennant, the most coveted trophy of the navy and awarded to the battleship having the highest average in both gunnery and engineering, has been won once before by the California, in the year 1921-22, when this ship was also awarded the engineering trophy.

Since electric battleships have been in commission, the battle efficiency pennant has been awarded but once to a non-electric ship. This was for the year 1922-23, when it was won by the Pennsylvania. Other General Electric equipped ships to capture this annual honor have been the New Mexico and West Virginia.

The De Laval Pacific Company has recently been appointed exclusive representative on the Pacific Coast and in the Orient for the Andale Engineering Company of Philadelphia. Strainers, grease extractors, feed water heaters, oil coolers, gas coolers, air heaters, and coolers, evaporators, and distillers are some of the Andale products that will be handled. Attractive pamphlets describing these devices are now available.

The De Laval Pacific Company offers a high class engineering service backed by the technical staff of the Andale Engineering Company, **D. Raymond McNeal**, general manager.

At a recent meeting of the stockholders of **The Sperry Gyroscope Company,** Elmer A. Sperry, founder of the company, was elected chairman of the board of directors, and Charles S. Doran president and general manager. Mr. Doran recently sailed for Europe on the Leviathan. While abroad Mr. Doran will visit the works and offices of The Sperry Gyroscope Company, Ltd. and the various European agencies.

Willis H. Rooks, clerk for 37 years in the Seattle office of the United States Steamboat Inspection Service, and known to thousands of Pacific Coast shipping and seafaring men, was retired recently under pension. Captain William Fisher, supervising inspector for Washington and Alaska, on behalf of the employes of the Seattle office, presented Mr. Rooks with a handsome signet ring, suitably engraved.

American Brown - Boveri Electric Corporation announces the opening of a district sales office in Philadelphia at 922 Witherspoon Building. Mr. Louis T. Peck will be in charge.

A. E. Hitchner, an executive of the East Pittsburgh headquarters of the **Westinghouse Electric and Manufacturing Company** has been promoted to the managership of the company's Los Angeles office, the post having been made vacant by the resignation of K. E. Van Kuran.

Mr. Hitchner is a native of New Jersey and spent his early years on the Atlantic Coast. After obtaining his degree in electrical engineering from Rutgers in 1904, he entered the apprentice course for college graduates at the Baldwin Locomotive Works in Philadelphia, remaining there two years. He left there to join the Link-Belt Company, also located in Philadelphia, and for two years was active in construction work of the company. His next work was operating the Kaoline Mine located in Florida. After a year of mine operations he joined the Westinghouse company, 1909, and was assigned to general industrial sales work in the Philadelphia office.

In 1919 he was transferred to the East Pittsburgh headquarters of the Westinghouse company as assistant to manager of the Industrial Department, his work having to do specifically with mining and oil industries. He remained in this position until this latest promotion.

He is a member of the University Club of Pittsburgh, and of the Zeta Psi Club of New York City.

American Brown - Boveri Electric Corporation announces the following, effective July 29, 1926.

Harry A. Magoun, one of the outstanding figures in the major shipbuilding field who joined the forces of the New York Shipbuilding Company (now American Brown - Boveri Electric Corporation) as assistant to the president on August 1, 1907, was made vice-president, October 8 of the same year, and senior vice-president, September 9, 1918, has at his own request been relieved from active duty and will hereafter act as consultant in the shipbuilding division.

Wm. G. Groesbeck, vice-president since September 9, 1918, has also requested to be relieved from administration duties and responsibilities. He will continue as vice-president, acting in an advisory capacity in all matters relating to procurement of shipbuilding contracts and will conduct all correspondence, etc. with the United States Navy and other divisions of the government. He will be assisted by R. A. Workman.

W. S. Newell is appointed general manager of the shipbuilding division. He will have administrative control of all forces and the execution of all shipbuilding or other activities of this division.

The Cunningham Whistle

THE Allan Cunningham air operated whistle designed and built by Allen Cunningham of Seattle, is a favorite among motorboat and motorship operators on the Pacific Coast and is also fast becoming popular on the Atlantic seaboard. Over 500 installations were made during the first six months of the present year in the Pacific Northwest.

This whistle, designed primarily for motorships and motorboats of all sizes, is a comparatively new product, having been put on the market for the first time in its present form late last year.

It is made in six sizes; the smallest suitable for the smallest motorboat and the largest suitable for the largest motorship that can be built.

The design is based on the discovery of a hitherto unknown principle relating to the vibration of metallic diaphragms made after three years of experimental work and study. Size for size the whistle will give unblieveably greater carrying power and volume with a smaller expenditure of energy than any other whistle heretofore placed on the market. The economy therefore is very marked, and consequently the problem of maintaining a sufficient air supply, particularly in foggy weather, is greatly simplified. It gives a true whistle tone with remarkable echoing qualities, the value of which is well known to all operators and owners of boats, particularly in harbor and coastwise operation.

The whistle can be supplied for use on any pressure up to 300 pounds to the square inch; consequently, in diesel-engined boats it can be connected directly to the maneuvering air tanks, thus eliminating the necessity for a reducing valve and separate whistle tank, and saving the boat owner this additional expense.

In the case of small boats driven by gas engines not fitted with an air compressor, a sufficient supply of air can be secured by using an inexpensive pressure accumulator mounted on one cylinder of the engine. This is made possible by the extremely small amount of air required for the operation of the whistle.

Ets-Hokin and Galvan Company of San Francisco carry a stock of the Cunningham whistles and are placing many on the motor workboats of San Francisco Bay.

Conversion to Diesel Electric Drive

THE Atlantic Refining Company, will recondition and place in operation early in 1927, three diesel-electric tankers, among the largest of their kind in the world for operation in trans-Atlantic service. These tankers were recently purchased from the Shipping Board and were formerly known as the Sharon, J. M. Connally, and Bessemer, each 7000 deadweight tons. They were formerly operated by steam.

The diesel engines will be furnished by the Ingersoll-Rand Company and the electrical equipment will be supplied by the General Electric Company. Each tanker will be equipped with three 850-horsepower, 225-r. p. m., diesel engines, each driving a 523-kilowatt, 250-volt generator for propulsion and a 50-kilowatt, 250-volt auxiliary generator for excitation and ship's auxiliary power. The propulsion generators will supply power to an 1800-horsepower, 90-r. p. m., 750-volt double motor to be direct connected to the propeller shaft.

The tankers will be fitted with electric auxiliaries, all of which will be driven by General Electric motors. These auxiliaries will include two 80-horsepower cargo pumps, one 45-horsepower windlass, one 30-horsepower mooring winch, one 30-horsepower fire and bilge pump, two 15-horsepower air compressors, a balancer set and numerous small pumps, as well as a 25-kilowatt auxiliary generator driven by a small oil engine which will be used for emergency and in port.

The P R Solid Injection Diesel

THE Type "PR" Marine Oil Engine manufactured by the Ingersoll-Rand Company combines the simplicity of the so-called semi-diesel type with the fuel economy and cold starting features of the air-injection diesel engine. As it operates on the direct-injection system of fuel, there is no need for 1000-pound, three, or four stage injection air compressor with its numerous adjuncts, such as intercoolers, aftercoolers, high pressure air piping, and injection air bottles.

The following seven advantages accrue from this design and operation of the PR direct reversing oil engine:

Reduction in weight of 10 to 12 per cent—a factor which increases the carrying capacity and earnings of the vessel.

Decrease in over-all length of the unit, which permits of a shorter engine room.

Gain of 10 to 15 per cent in mechanical efficiency, and a resulting improvement in fuel consumption per horsepower delivered.

Simplicity of machine with a resultant increase in realibility and durability.

Fewer delicate parts with a corresponding reduction in maintenance upkeep cost.

Greater ease in obtaining suitable operators.

Elimination of the need for a high pressure emergency air compressor.

In the acquisition of the seven above advantages, none of the valuable features of the air injection engine have been sacrificed.

The compression employed in these engines is appreciably less than that necessary for the air injection diesel—this reduction being made possible because the refrigerating effect of the expanding injection air has been eliminated. However, there is still more than enough compression for starting the engine from a cold condition without the use of hot bulbs, hot plates, hot tubes, electric ignitors, or other source of extraneous heat.

The long list of fuels ordinarily recommended for motorship use is augmented somewhat, it is stated, by the fact that the manufacturers sanction a higher percentage of sulphur content. Because of the higher mechanical efficiency, an even lower fuel consumption per brake horsepower is obtained.

The single lever control for starting, stopping, reversing and controlling the speed and at the same time assuring perfect functioning of the engine is a feature of the PR Ingersoll-Rand direct-connected engine.

This centralized control assures immediate response to signals from the pilot, provides quick maneuvering in traffic and makes it possible to start the "cold" engine in a very few seconds.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

NEW UNION OIL TANK BARGE.

Bids were opened on August 2 by the Union Oil Company of Cailfornia, A. O. Pegg, marine superintendent, Union Oil Building, Los Angeles, for another diesel-driven tank barge for Pacific Coast service. The general characteristics are:

Length over-all	216'0"
Length between Perpendiculars	210'0"
Beam molded	42'0"
Depth molded	16'0"
Draft loaded	13'0"
Capacity, barrels of oil	12,000

Propulsion machinery will consist of two 350-horsepower, single-acting, directly reversible, marine heavy duty type diesel engines, each directly connected to a propeller shaft. One 250-horsepower diesel engine is to be installed, connected to two cargo pumps of 1500 barrels an hour capacity at 150 pounds discharge pressure.

Bids were submitted by the following: Bethlehem Shipbuilding Corporation, San Francisco, $291,000 and 145 days; The Moore Dry Dock Company, $256,567 and 180 days; Los Angeles Shipbuilding & Drydock Corporation, $233,350 and 135 days.

It is believed that the Los Angeles concern will be awarded the contract and that Pacific Coast built diesel engines will be installed.

DIESEL FERRYBOAT TO BE BUILT FOR PUGET SOUND.

The Sound Ferry Lines, Seattle, Washington, have under consideration the construction of a diesel-powered passenger and automobile ferryboat which will cost about $125,000. She will be one of the finest and fastest on Puget Sound and is to be ready for service by April 1, 1927. Bids for the vessel will be requested before the first of September by Lee & Brinton, Seattle naval architects, who are preparing plans and specifications. Captain O. Joyce is vice-president and general manager of the Sound Ferry Lines and personally in charge of the matter.

The ferryboat will be 176 feet over-all, 52.4 feet beam, and 12 feet draft. She will have capacity of sixty automobiles and will be able to carry a maximum of 500 passengers and maintain a speed of 13 knots. Power will be supplied by a 900 horsepower diesel engine. It is reported that the engine is already nearing completion. The hull will be of wooden construction.

There will be a modern lunch room promenade deck, library and writing room for the crew, and commodious passenger accommodations.

LOS ANGELES STEAMSHIP COMPANY TO RECONDITION PRESIDENT ARTHUR.

Purchase of the liner President Arthur, to be placed on the Hawaiian run with the steamships City of Los Angeles and Calawaii this winter, was announced August 17 by Ralph J. Chandler, vice-president and general manager of the Los Angeles Steamship Company. Extensive improvements, decorations, and refurnishing of passenger quarters, together with the purchase price, will involve an expenditure of $1,750,000.

The work will probably be awarded to the Los Angeles Shipbuilding & Drydock Corporation.

The vessel was one of the crack liners of the North German Lloyd, and was built at the Vulcan Works, Stettin, Germany, for tropical service under the name of Princess Alice. She was taken over by the United States Government in 1918 and rechristened Princess Matoika. Later she was used as a convoy for American troops to France, and at the close of the war was turned over to the Emergency Fleet Corporation. She has been on the New York-Southampton-Bremen route recently.

The vessel is of steel construction, twin screws, and four decks. She is 523.5 feet long, 60.1 beam, and 34.7 depth, and is propelled by quadruple expansion steam engines.

The President Arthur is lying in New York Harbor, whence she will be brought to this coast by her new owners about the middle of September. Here she will be placed in a shipyard for conversion from a coal-burner to an oil-burner; for the installation of new boilers and certain auxiliary machinery, and for extensive improvements, decoration and furnishings of her passenger quarters, which, it is determined, shall make her one of the most luxurious liners on the Pacific, replete with every travel comfort and convenience which the art of passenger steamship operation has developed during recent years, including a gymnasium and a handsome tiled swimming pool.

According to the plans the liner will have first-class accommodations for 350 passengers. The greater majority of the first-class quarters will be furnished with beds, all will have hot and cold running water, and 55 per cent of the staterooms will have private or connecting baths.

The record of the President Arthur shows her to be a 16 to 17-knot ship, thus matching the speed of the City of Los Angeles, flagship of this line, and enabling her to maintain the same five-and-one-half-day schedule for voyages to and from Honolulu. Built especially for tropical service, the President Arthur is said to be ideal for the run. Her decks are from four to ten inches higher than the average liner, thus permitting exceptionally good ventilation. Her staterooms and all public saloons are unusually spacious and she is said to have one of the handsomest music saloons of any of the liners of her type.

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GOLDEN GATE FERRY PLANS.

The Golden Gate Ferry Company, San Francisco, on August 20 applied to the State Railroad Commission for permission to issue and sell $1,900,000 worth of bonds for the purpose of raising funds to build five new ferryboats. Three of these boats are to be used for the proposed new vehicular ferry service between San Francisco and Berkeley.

SOUTHERN SHIPYARD LOW BIDDER ON LIGHTHOUSE TENDER.

The Southern Shipyard Corporation, Newport News, Virginia, submitted low bid for the construction of a steel, single screw, steam propelled lighthouse tender for the Bureau of Lighthouses, Department of Commerce, Washington, D. C. The boat is to be 101 feet 3 inches length over-all, 21 feet molded beam, 8 feet 6 inches depth. The propelling machinery will consist of a triple expansion, 3-cylinder steam engine driving a right hand propeller. Steam will be supplied by one coal-burning water-tube boiler of the Almy, Class E or similar type.

The bid submitted by the Southern Shipyard for this work is $127,561.

BARGES FOR COLOMBIA.

Rumie Brothers, 25 Broadway,' New York, have asked for bids for the construction of a sternwheel towboat for Colombia buyers. The towboat is to be of sufficient power to tow four barges of 80 tons capacity each, on a draft of about 2½ feet. The towboat is to be shipped knocked-down and assembled in Colombia.

The Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York, have called for bids on the construction of a chemical barge, chemical motor barge, and a tugboat and motorboat for delivery at South Charleston, West Virginia.

The Emergency Fleet Corporation, Department of Maintenace and Repair, 45 Broadway, New York, will receive bids on September 1 for the installation of the Busch-Sulzer single-acting diesel engines on two of three freighters selected by the Shipping Board for conversion to diesel drive. The vessels are the Seminole, the Yomachichi, and the City of Dalhart. The former ship is now at Staten Island and the latter two in the James River.

FAST RIVER VESSEL FOR COLUMBIA.

The Harkins Transportation Co., foot of Adler Street, Portland, Oregon, L. O. Hosford, president and manager, announces that it is planning a new vessel for express passenger service between Astoria and Portland. The company hopes to work out plans for a vessel that will carry 700 passengers and operate at a speed above 20 knots.

The Canadian Pacific steamships Montcalm, Montclare, and Montrose, during their annual overhaul next winter will have their refrigerator capacities increased about 27,000 cubic feet.

The Navy Department has advised that plans and specifications for the new cruiser are now being prepared and contract will be awarded during January of next year.

Builders of steam and internal combustion engines should be interested in a statement made recently by Captain O. S. Sternvail, chief of the Chinese maritime customs at Ichang, upon his arrival at Seattle from the Orient. Captain Sternvail stated experiments with heavily powered small tonnaged steam vessels for operation on the Yangtze River, Central China, have proved very successful and thirty-eight of this type were added to the gorge fleet last year, which now numbers more than eighty carriers. The route covered by these steam vessels covers 250 miles and the powered craft are driving out thousands of small junks. The market for reliable power plants for small craft on this river is almost limitless.

FERRYBOAT CONTRACTS STILL IN ABEYANCE.

"Watchful waiting" is the order of the day on the Southern Pacific Company's diesel-electric ferryboat situation. Bids were opened July 7 in San Francisco for from three to five steel diesel-electric vehicular ferryboats but no decision was reached by the Board of Directors at their last meeting. The matter was given into the hands of a special committee of the company's officials, who will probably come to a decision shortly.

Several matters have arisen which might influence the company; namely, the fact that the San Francisco Supervisors have not yet sanctioned the contemplated automobile ferry service from San Francisco to Alameda and also the two applications made by the Key Route Ferry Company and the Golden Gate Ferry Company to operate automobile ferry service between San Francisco and the Alameda side of the bay. These would, if granted, be in direct competition with the Southern Pacific service.

Whichever way the matter is settled, it is a certainty that a large number of new automobile ferryboats will be built for San Francisco Bay within the very near future. The Golden Gate Ferry Company, San Francisco, A. O. Stewart, president, and Harry Speas, manager, announces during July that they shall order three and possibly four new ferryboats at once. The General Engineering and Drydock Company recently completed the diesel-electric ferryboat Golden State for this company.

The Key System Transit Company also announced that in the event their application to operate automobile ferry service is given favorable action, they will soon find it necessary to build new ferryboats and remodel others. This company has announced an $11,000,000 program for improvement and expansion.

Recent Shipbuilding Contracts

American Bridge Company has an order for six covered barges for the Carnegie Steel Company, to be 175 by 26 by 11 feet.

Dravo Contracting Company, Pittsburgh, Pa., has a contract for a diesel-engined towboat for the Labelle Transportation Co., to be 110 by 26 by 5 feet and 215 gross tons; also an order for seven pile driver hulls for the U. S. Engineers, St. Louis, to be 88 by 25 by 4 feet; and four steel barges for the Keystone Sand & Supply Co., 135 by 27 by 8 feet and 320 gross tons each.

Midland Barge Company, Midland, Pa., has an order for fifteen barges for the Inland Waterways Corporation, New York City, a government agency, to be 126 feet long, 33 feet beam, and 7 feet 6 inches depth; this company also has an order for one hull for Dillman Egg Case Company; also order for one barge for Southern Cotton Oil Company, 100 by 35 by 7 feet.

Dubuque Boat & Boiler Works, Dubuque, Iowa, has a contract from the Inland Waterways Corporation, New York, for three towboats for use by the Upper Mississippi Barge Line at a cost of $165,000 each. Plans were prepared by Marine Architect Cox of New York.

The Pusey & Jones Company, Wilmington, Del., has closed a contract with the Hudson River Day Line, New York, for a single screw steel day steamer for Hudson River. The boat is to be 252 feet between perpendiculars, and 46 feet beam. She will have triple expansion, 4-cycle engines developing 2800 indicated horsepower. Steam will be supplied by four Babcock & Wilcox watertube boilers.

Bids submitted to J. W. Millard & Brother, naval architects of New York, who designed the vessel were:

The Pusey & Jones Co., $621,245, delivery May 1, 1927; Newport News Shipbuilding & Drydock Co., $694,000 and 10 months; American Brown-Boveri Electric Corporation, $685,000, delivered May 1, 1927; Bethlehem Shipbuilding Corporation, $711,170, delivery May 28, 1927; Sun Shipbuilding & Drydock Company, $736,000, delivery 9½ months; Federal Shipbuilding & Drydock Company, $749,000 and 10 months; Staten Island Shipbuilding Co., $878,000 and 10½ months. All these bids covered Babcock & Wilcox water-tube boilers.

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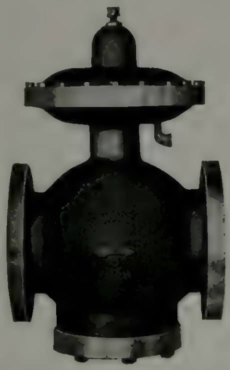

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The American Ship Building Company, Cleveland, Ohio, has received an order from the Kinsman Transit Co. for a self-unloading bulk freighter for Great Lakes service. The vessel will be 580 feet between perpendiculars, 60 feet beam, and 20 feet loaded draft. She will have a speed of 13 miles and deadweight of 12,000 tons. Triple expansion engines developing 2500 indicated horsepower and three Scotch marine boilers will make up her propulsion unit.

This shipyard also has an order for another self-unloading bulk freighter for the Bradley Transportation Co., to be 615 feet between perpendiculars, 65 feet beam, and 20 feet loaded draft. The vessel will have a speed of 14 miles and deadweight tonnage of 13,000. She will have turbo-electric drive, be of 4000 indicated horsepower, and be equipped with two watertube boilers generating steam at 380 pounds pressure.

This makes a total of five bulk freighters under contract by this yard at the present time, representing a deadweight tonnage of 62,500.

Ballard Marine Railway Company, Salmon Bay, Seattle, has a contract from Young Brothers of Honolulu for a 40-foot towboat for Hawaii service. L. H. Coolidge of Seattle is the designer. The tug will be similar to the Mahoe which was designed and built by the same parties last year for Young Brothers and has given excellent satisfaction. The new tug will be powered with a Fairbanks-Morse diesel engine of 60 horsepower.

Prince Rupert Drydock & Shipyards, Prince Rupert, B. C., has an order from the British Columbia Forestry Department for a 40-foot launch.

Bethlehem Shipbuilding Corporation has just closed a contract for a 10,000-barrel oil barge to be built at their Harlan Plant, Wilmington, Delaware, for the Seaboard Shipping Corporation; this barge for service in New York harbor. Delivery is to be made January 1, 1927.

William Muller, Wilmington, California has an order for a third tug for the Wilmington Transportation Company. The order was placed following the trails of the tugboat Milton S. Patrick, which was the second of two tugboats just built by William Muller for this firm, both of which are now in service. While the size, type, and power for the new craft have not been finally decided, the company officials favor another tug similar to the Davis P. Fleming and the D. M. Renton, built last year for the same owners. These tugs are equipped with Winton deisel engines of 250 horsepower.

KEEL LAYINGS

Six steel motor patrol boats for U. S. Coast Guard by American Brown-Boveri Electric Corp. during July.

Two carfloats for N. Y., N, H. & Hartford R. R. by Bethlehem Shipbuilding Corp., Fore River Plant, July 14 and 15.

Lighter for stock by Charleston Dry Dock & Machinery Co., Aug. 6.

Steel carfloat for Pennsylvania R. R. by Wm. Cramp & Sons Ship & Engine Building Co., July 28.

Deck barge for stock by Nashville Bridge Co., Nashville, Tenn., Aug. 2.

Barge for stock by Charles Ward Engineering Works, Charleston, W. Va., July 27.

LAUNCHINGS.

Margnita, mail, freight, and passenger boat for Coastwise Transportation Co., Juneau, Alaska, by J. C. Johnson's Shipyard, Port Blakely, Wn., Aug. 4.

Passenger and auto ferryboat for Fisher's Island Navigation Co. by Bethlehem Shipbuilding Corp., Wilmington, Del., July 22; barge for U. S. Engineers, Savannah, July 21.

Louisiana, steam ferry, catamaran type, for Baton Rouge Trans. Co., by Howard Shipyards & Dock Co., Jeffersonville, Ind., July 21.

Deck barge for stock by Nashville Bridge Co., Nashville, Tenn., July 16.

Two steel barges for Kelly Axe & Tool Co. by Chas. Ward Engineering Works, Charleston, W. Va., July 20 and 27.

DELIVERIES.

Two steel barges for U. S. Army Engineers, Portland, by Albina Marine Iron Works, Portland, Ore., June 23

WM. CORNFOOT, President GEO. RODGERS, Sec'y-Treas.

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and 28.

Two scows for Reed Mill Co., Shelton, Wash., by J. C. Johnson's Shipyard, Port Blakely, Wash., July 21.

Two steel barges to The Barrett Line, Cincinnati, by American Bridge Co., Pittsburg, Penn.

One carfloat to N. Y. Central R. R. by American Brown-Boveri Electric Corp., July.

Philadelphia, ferryboat for Philadelphia & Reading R. R. Co. by Bethlehem Shipbuilding Corp., Wilmington, Del., July 23.

Dorchester, combination passenger and freight steamer for Merchants & Miners Transportation Co., Baltimore, by Newport News Shipbuilding & Drydock Co., July 17.

Siele, twin screw diesel yacht for John H. French, Detroit, by The Pusey & Jones Co., July 13.

Dan Hardie, steel hull ferryboat for Peninsula Terminal Co., Miami Beach, Fla., by Spedden Shipbuilding Co., Baltimore, July 31.

E. D. Kenna, sternwheel towboat for The Ohio River Co. by The Charles Ward Engineering Works, Charleston, July 13; steel barge for Kelly Axe & Tool Co., July 31.

REPAIRS.

ALBINA WORKS TO REPAIR COLUSA.

The Albina Marine Iron Works, Portland, Oregon, have received a contract for repairing the steamer Colusa on a bid of $42,985 and time limit of 18 days. Todd Dry Docks, Inc., Seattle, was a close second, with a bid of $43,000; Commercial Iron Works, Portland, bid $44,375; Smith & Watson Iron Works, $48,000; and the Willamette Iron & Steel Works, $48,130.

Specifications for repairs require a new upper and lower section of stem, 24 new shell plates, four new deck plates, four new deck beams, and two bulkhead plates and stiffeners, also a port hawse pipe, three longitudinal frames renewed, and two webb frames renewed in part.

TODD PLANT REPAIRS WILLHILO.

The steamer Willhilo of the Williams Line, which was damaged in collision with the Grace steamship Colusa, is undergoing repairs at Todd Dry Docks, Inc., Harbor Island, Seattle. Repair work will require three of four weeks.

EXTENSIVE DAMAGE TO LA PLACENTIA AND EAGLE.

The Moore Dry Dock Company, Oakland, was awarded contract August 25 for damage repairs to the Union Oil tanker La Placentia on a bid of $34,548, The vessel was badly damaged in a collision off the Golden Gate with the Williams Line freighter Eagle August 19. There was a dense fog outside the Gate at the time and the accident has been held unavoidable.

The freighter Eagle is also extensively damaged and her repairs will cost about $20,000.

CHANGE ANNOUNCED ON REPAIRING SHIPPING BOARD SHIPS.

A new policy in repairing United States Shipping Board vessels which are operated by private shipping companies has just been announced by Brig. Gen. A. C. Dalton, president of the Emergency Fleet Corporation. He explained orally that, after September 1 the corporation will repair its own vessels.

Hitherto, the corporation allowed each operator to make its own repairs, the Shipping Board paying the bill, within certain limits. General Dalton says he expects to accomplish considerable savings through the new arrangement.

Capt. W. E. Griffiths, manager of operations of the corporation from 1922 to 1925, who resigned on June 25, 1925, has been selected as the new director of the corporation's New York district for the new work of repairs. He will relieve Capt. R. D. Gatewood, manager of the New York district.

The duties of Captain Gatewood, it was announced, will be enlarged to place him in charge of all maintenance and repairs of all vessels of the Shipping Board. His official headquarters will be in Washington, but he will also keep offices in New York, and most of his time will be spent there, General Dalton stated.

General Dalton said that hitherto the manager of the New York district was not only in charge of the district but also had under his supervision maintenance and repairs and the diesel program.

AUSTRALIA TO HAVE NEW FLOATING DOCK.

The New South Wales State Cabinet recently appointed a sub-committee to go thoroughly into the question of costs of a new floating dock which it was proposed should be constructed at Newcastle. The State Cabinet has accepted the recommendation of the sub-committee for a 15,000-ton floating dock at a cost of approximately $2,965,000. Towards this the Commonwealth Government

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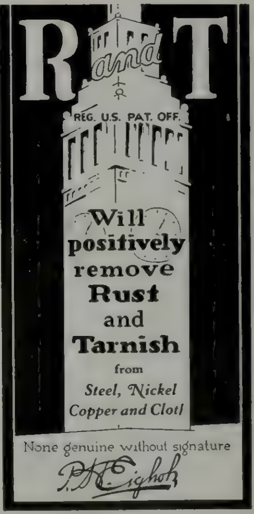
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is to provide a subsidy of some $675,000.

FIRST CONVERTED SHIP TO BE READY IN OCTOBER.

Rapid progress is now being made in the conversion program of the Shipping Board. Work is under way on four of the fourteen steamers selected for dieselization, and three others will soon be ready for installation of diesel engines. At the Fore River Plant of the Bethlehem Shipbhilding Corporation work has been started on the West Honaker and West Cusseta. The Crown City is soon to be turned over to the same plant. All three are to be equipped with McIntosh & Seymour diesel engines.

At the Newport News Shipbuilding & Dry Dock Company plant the Tampa and Unicoi are having Worthington double-acting diesel engines installed and the Swaokla and City of Bayville are ready for installation of Busch-Sulzer Bros. diesel engines.

The Tampa is expected to be ready for her sea trip the first part of October, and the West Honaker the latter part of the same month.

GARBUTT & WALSH TO ENLARGE PLANT.

The boat building firm of Garbutt & Walsh, Terminal Island, San Pedro, are going to build an addition to their boat shop to cost $18,000.

One of the first announcements sent out by the International Mercantile Marine Company relative to equipment aboard the new steamship building for the Panama Pacific Line at the Newport News Shipbuilding & Drydock Company, has to do with galley equipment. The galley equipment of the new liner will be copied from that on the liners Minnewaska and Minnetonka. Stew pans for the kitchen ranges alone will cost between $4000 and $4500. They will be of heavy copper, with nickel linings.

Above is a picture of Major R. T. Coiner christening, with a bottle of Canada "dry," a steel fuel barge built at the Albina Marine Iron Works, Portland, for the Second Portland District of Army Engineers. Major Coiner is the district officer in charge of work in the Columbia and Willamette Rivers

Articles of incorporation of the Western Shipbuilding Company, an Oakland, California, corporation capitalized at $750,000, were filed in the county clerk's office at Martinez August 14. Fred W. Peters, Mark R. Mouze, and Henry C. Andressen are named as directors.

HASKELITE BUSY.

The Haskelite Manufacturing Corporation report a large amount of new business in the marine field.

Among recent orders for Haskelite, waterproof plywood, and Plymetl, the armored Haskelite, for use in ship construction are the following:

Defoe Boat and Motor Works, Bay City, Michigan. Roof panels in deck houses and cabins of an 85 foot cruiser built for W. C. Rands of Detroit, Michigan.

Newport News Shipbuilding and Dry Dock Company, Newport News, Virginia. Panels for hulls of Merchants and Miners vessels; wall and door panels in writing and smoking room, also for bookcase and gun lockers on yacht for Robert Law.

Moore Dry Dock Company, Oakland, California, seating 2 ferryboats for Key System Ferries, Oakland, California.

' Bethlehem Shipbuilding Company. Wilmington, Delaware, Haskelite and Plymetl for use on Fishers Island.

Bethlehem Shipbuilding Company, Fore River, Mass., stateroom partitions, passageway bulkheads and built-in lockers and ends in deck houses of 3 boats, Honaker, West Cusseta, and Crown City.

Progress of Construction

Pacific Coast

ALBINA MARINE IRON WORKS
Portland, Oregon

Hull 507, steel barge for U.S. Army Engineers, 2nd District, Portland, Ore., 120' L.B.P.; 34' beam; **launched and delivered June 23/26.**

Hull 508, same as above; **launched and delivered June 28/26.**

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT
Potrero Works

Purchasing Agent: O. W. Streett.

Associates, hull 5330, diesel tank barge for Associated Oil Company; 160 L.B.P.; 38 breadth; 9'6" molded depth; 7' molded draft; 4000 bbls. oil capacity; Union diesel engs.; keel June 15/26.

J. C. JOHNSON'S SHIPYARD
Port Blakely, Wn.

Margnita, hull 74, mail, freight, and passenger boat for Coastwise Transportation Co., Juneau, Alaska; 90 L.B.P.; 22 beam; 15'6" draft; 200 H.P. diesel engs Keel Apr 24/26; launched Aug. 4/26; deliver Aug. 20/26 est.

Reed No 1, hull 76, scow for Reed Mill Co., Shelton, Wash.; 110'x36'x8'8"; **launched July 8/26; delivered July 21/26.**

Reed No. 2, hull 77, same as above; **launched July 15/26; delivered July 21/26.**

Hull 81, scow, for stock, 100x36'x8'8".

Hull 82, scow for stock, same as above.

THE MOORE DRY DOCK COMPANY
Oakland, California.

Purchasing Agent, Nat Levy.

No name, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; keel May 3/26; launch Oct. 1/26 est.; deliver Dec. 1/26 est

No name. hull 171. sister to above: keel May 3/26; launch Oct. 15/26 est.; deliver Dec. 15/26 est

Hull 169. steel carfloat for Atchison, Topeka & Santa Fe R.R.; 260' long; 38' beam; 7' draft; 620 D.W.T.; keel Apr. 1/26; launched June 29/26. deliver Aug. 31/26 est.

W. F. STONE & SON
Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

ST. HELENS SHIP COMPANY,
St. Helens, Oregon.

Larch, tender for Lighthouse Dept.; 63' long, 16' width, 6' hold; 100 H.P. Washington-Estep diesel engs

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 149' 2" x 33' 4"x5' 10-5/16".

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 170'x38'10"x6' 1¾"; **1 delivered July 29/26.**

Six steel barges for The Barrett Line, Cincinnati, 225'x40'x9'; **2 delivered.**

Two fueling scows for The Barrett Line, 100'x18' x8'.

Twenty (20) steel coal barges for Hillman Transportation Co.; 175x26x11 ft.; **10 delivered.**

Ten steel coal barges for Hillman Trans. Co., 175x26x11 ft.

Six barges covered for Carnegie Steel Co., 175x26 x11 ft.

AMERICAN BROWN-BOVERI ELECTRIC CORP.
Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

Hull 314, suction dredge for U.S. Engineers; 130' R.R.; 366' long; 2 tracks; platform; keel Apr./26.

Hulls 315-318 inc.; 4 carfloats for N.Y. Central R.R.; 366' long; 2 tracks; platform; keels (2) Apr. and (2) May/26; **3 delivered June/26; 1 delivered July/26.**

Hull 319, steel motor patrol boat for U.S. Coast Guard, Washington, D.C.; 125 L.O.A.; 23'6" molded beam; 220 tons displacement; Winton diesel engs; **keel July/26.**

Hull 320, same as above; **keel July/26.**

Hull 321, same as above; **keel July/26.**

Hull 322, same as above; **keel July/26.**

Hull 323, same as above; **keel July/26.**

Hull 324, same as above; **keel July/26.**

Hull 325, same as above.

Hull 326, same as above.

Hull 327, same as above.

Hull 328, same as above.

Hull 329, same as above.

Hull 330, same as above.

Hull 331, same as above.

Hull 332, same as above.

Hull 333, same as above

Hull 334, same as above.

Hull 335, same as above.

Hull 336, same as above.

Hull 337, same as above.

Hull 338, same as above.

Hull 339, same as above.

Hull 340, same as above.

Hull 341, same as above.

Hull 342, same as above.

Hull 343, same as above.

Hull 344, same as above.

Hull 345, same as above.

Hull 346, same as above.

Hull 347, same as above.

Hull 348, same as above.

Hull 349, same as above.

Hull 350, same as above.

Hull 351, same as above.

Hull 352, diesel-electric vehicular ferryboat for Electric Ferries, Inc., New York; 155 L.O.A.;

Shipping Personals and Items of Interest

Arrow Line. The intercoastal service of the United American Lines is now known as the Arrow Line, with **Sudden & Christenson,** San Francisco, as managing agents. The change was effective August 1. Other Pacific Coast agencies for this line are Sudden & Christenson at Seattle, Columbia Pacific Shipping Company at Portland, and the Los Angeles Steamship Company at Los Angeles. Sudden & Christenson announce westbound sailings fortnightly from Baltimore and Savannah to Pacific Coast ports and eastbound from Seattle, Portland, San Francisco, Oakland, and Los Angeles to Baltimore, New York, and Savannah monthly with general cargo; fortnightly with complete cargoes of lumber for New Work and Baltimore.

S. Soderblom has been appointed manager of the newly created passenger department of the General Steamship Corporation, with headquarters in San Francisco. This new department has been created to take care of the increasing passenger business carried on by the General Steamship Corporation through the various lines which they operate to Europe, South America, Australia, and the Orient. The company will also have passenger representatives in Seattle, Portland, Vancouver, and Los Angeles.

"While passenger travel is by no means an innovation on the vessels which we operate," said Harry S. Scott, president of the company, in making this announcement, "this step has been deemed advisable in view of the increased number of sailings in our services, including the addition of many new and modern motorships with enlarged passenger accommodations."

The Admiral - Oriental Line has leased for a period of five years Pier 40 and Pier 41 at Smith Cove Terminals, Seattle, for use in the operation of its trans-Pacific fleet recently purchased from the Shipping Board.

Norway - Pacific Line, operating freight service between California ports and ports of Europe, has announced through its San Francisco manager that two vessels now under construction will be added to this fleet about the first of next year. The vessels will be 435 feet long, of 10,630 deadweight tons, and will have speed of 13½ knots and cargo hold capacity of 503,415 cubic feet. They will also have refrigerator accommodations of 65,900 cubic feet.

The American - Australian - Orient Line, is the new title given to the consolidated services of the American Far East Line and the Pacific-Australia Line, operated by Swayne & Hoyt for the Shipping Board. Swayne & Hoyt, by taking over the operation of the Shipping Board Line, together with their own ships, now operate a total of eighteen steamers, twelve in the trans-Pacific trade and six in the Pacific-Caribbean-Gulf service.

Kawasaki Kisen Kaisha, for which Yamashita Company are San Francisco agents, has announced that they will operate regular freight service from San Francisco direct to the Orient, starting on October 18, returning by way of Portland. B. Sawada is California manager.

W. R. Grace & Co. have purchased the steamer Deuel from the Shipping Board and will operate her in their passenger and freight service between the United States and the west coast of South America. The company further announced that all the steamers of the fleet are being changed over to accommodate a goodly number of passengers and in the future the company will go after the passenger business, which has, in the past, been a side issue, as well as the cargo trade

---

Stevedoring at Canal. Announcement was made by M. L. Walker, Governor of the Panama Canal Zone that, effective August 1, the authority heretofore given to steamship companies to do their own stevedoring on the Cristobal and Balboa docks would be revoked, and that thereafter all stevedoring on the docks will be performed by the forces of the receiving and forwarding agent of the Panama Railroad at the published tariff rates. It is stated that this policy has been adopted in order to insure equal distribution of labor and service and improve operation of the docks.

H. H. Raymond, president of the Clyde Mallory Lines, has been selected by the directors of the newly organized **Ocean Transport Company** to serve as its first president.

This company plans to engage exclusively in the intercoastal lumber trade loading at Pacific Northwest ports for delivery of cargoes to Caribbean, West Indies, and North Atlantic Coast ports.

W. L. Comyn & Co., who operate a large fleet of vessels, principally sailing schooners, in the lumber carrying trade between Pacific Coast ports and Australia, the Orient, and South America, have announced their intention to move their headquarters from San Francisco to Seattle. The change will be effective about October 1. A branch office will be maintained in San Francisco, under the management of W. Williamson, treasurer of the firm, who will take care of the handling of redwood, white pine, and general merchandise shipments.

The firm is an old one on the Pacific Coast, having originally been known as Comyn, Mackall & Co. W. Leslie Comyn is president and R. M. Roberg, vice-president.

Neil S. Laidlaw, district manager of the Garland Line at San Francisco, has announced the appointment of **Thomas J. Halcrow,** well-known Pacific Coast shipping executive, as district freight agent of the line. Mr. Halcrow will work in conjunction with Herbert Lindley, assistant district manager.

Freight Report

Continued from Page 423.

ese s. Kurohime Maru, lump sum $38,000, Sept.

The following steamers are reported fixed with lumber to the Atlantic Coast: American s. Commercial Guide (or substitute), Aug./Sept., W. L. Comyn & Co.; American s. Oneida, $12.50, Aug./Sept., South Alberta Lumber Co.; Danish m.s. Sally Maersk, box shooks, Aug.

The British m.s. Speybank is reported fixed from the North Pacific to four ports South Africa, Aug./Sept. J. J. Moore & Co. and the British s. Orient City, North Pacific to South Africa, Sept.

The following time charters are reported: British s. Doonholm, delivery and redelivery Australia via North Pacific, July, J. J. Moore & Co., Inc.; British s. Trewyn, delivery and redelivery Australia via North Pacific, J. J. Moore & Co., July; American m. s. Frank Lynch, North Pacific to Mexico, Aug., Ogden & Linderman; British s. Welsh City, North Pacific to Japan, lumber, one trip relet, North Pacific Shipping Co.; Norwegian s. Yarra, Australian trade, 6 months, delivery British Columbia, redelivery Australia, J. J. Moore & Co., Aug.; British s. Carspey, North Pacific to Australia, delivery Australia, J. J. Moore & Co.; Swedish m.s. Erik Frisell, Pacific trade, delivery Los Angeles, Canadian Transport Co.; Aug./Sept.; Norwegian s. Torvanger, British Columbia to North of Hatteras, lumber, $1.25, delivery British Columbia, South Alberta Lumber Co., Sept.

The following sales are reported: American s. Buffalo Bridge, Tashmoo, Chetopa, Fort Armstrong, Sunwied, Marsodak, and Plow City, U. S. Shipping Board to Charles Nelson & Co.; American tank steamer Col. E. Drake, Standard Oil Co. (Calif.) to General Metals Supply Co. (to be scrapped); American s. Coloradan and Honoluluan, General Metals Supply Co. to Japanese; American s. Deuel, U. S. Shipping Board to W. R. Grace & Co.

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Pacific Marine Review

The National Magazine of Shipping

October, 1926

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Official Organ
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Official Organ
SHIPOWNERS' ASSOCIATION

Pacific Marine Review, Vol. 23, No. 10, Published Monthly at San Fancisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

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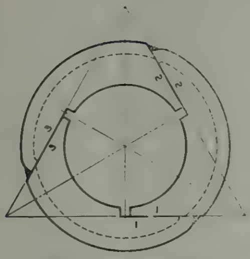

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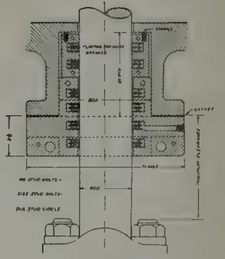

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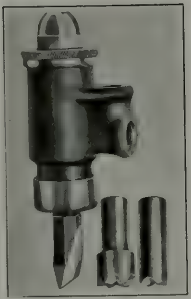

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Pacific Marine Review

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As we go to press the announcement is made to Pacific Marine Review by officials of the various firms that the following important contracts for ferryboat construction have been awarded:

Southern Pacific Company	3 Ferryboats to Bethlehem Shipbuilding Co.
Northwestern Pacific Railway Co.	2 Ferryboats to Moore Dry Dock Co.
Northwestern Pacific Railway Co.	1 ferryboat to General Engineering & Drydock Co.
Golden Gate Ferry Company	3 Ferryboats to General Engineering & Drydock Co.

All of these boats are to be diesel-electric drive.

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OCTOBER 1926 Vol. XXIII. No. 10

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S. Hines.
Published on the 25th of each month preceding the publication date.
Advertising and editorial forms close on the 15th.
Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Official Organ
Shipowners' Association of the Pacific

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Shipowners Re-elect Officers

AT the annual meeting of the Shipowners' Association of the Pacific Coast, held September 22, 1926, F. J. O'Connor was re-elected president of the association. This will represent Mr. O'Connor's fourth term as president. R. W. Myers was re-eletced vice-president, being his second term, and Nat Levin was re-elected secretary-treasurer.

The number of directors was increased from nine to twelve, and the following directors were elected, the last three named being the new members of the board:

F. J. O'Connor of the Donovan Lumber Company.
R. W. Myers of Hobbs, Wall & Company.
James Tyson of Chas. Nelson Company.
S. M. Hauptman of Chas. R. McCormick Company.
L. C. Hammond of Hammond Lumber Company.
Otis R. Johnson of Union Lumber Company.
L. C. Stewart of Sudden & Christenson.
S. D. Freeman of S. S. Freeman & Company.
H. F. Vincent of E. K. Wood Lumber Company.
W. R. Chamberlin of W. R. Chamberlin & Company.
John L. Reed of J. R. Hanify Company.
J. C. McCabe of A. F. Mahony.

What is an Industrial Accident?

AN industrial accident is ordinarily defined as an injury to a workman. This does not take into consideration the true meaning and cost of accidents. The real definition is:

An industrial accident is an interruption of the orderly routine.

There are two kinds of industrial accidents, i. e., true accidents, or those which result in personal injury and near accidents, or those which do not result in personal injury. As the result of long experience, safety engineers have found that there are one hundred times as many near accidents as true accidents and that the near accidents are ten times as costly as the true accidents.

If a pile of lumber falls over, it must be rebuilt. If a truck runs into a hole in the floor and the load is spilled, it must be picked up. Possibly every following truck must detour or wait until the way is cleared. No report is made of these things unless a man is hurt, but the added labor cost is there, seen or unseen.

The safety engineer endeavors to prevent such interruptions, because every one of them is costly and may lead to an injury. The success of his work is commonly measured by the reduction of accident reports and the fact that his activities have decreased production costs is overlooked. As a matter of fact, the decrease in true accidents and near accidents brings about increased efficiency of the men, promotion of loyalty and cooperation, reduction of labor turnover, and increase in production.

No plant can be efficient until it is safe.

The above is Accident Prevention Bulletin No. 1 issued by the Department of Safety and Welfare of the Waterfront Employers Union of San Francisco. We might add the rather startling reflection that the "ten times as costly" losses from near accidents are not covered by P, and 1, or any other form of insurance.

Courtesy a Transportation Asset

THROUGH its excellent magazine the "Southern Pacific Bulletin", the Southern Pacific Company recently carried on an essay writing contest, using the theme "Courtesy." On the announcement of this contest Paul Shoup, executive vice-president of the Southern Pacific, made the following comment:

> Courtesy should be a subject for fruitful discussion indeed. In word, in action, in bearing, it has almost infinite forms. It is the finest guise that human relationship in the long years of life takes on.

The first grand prize was won by Miss Jessie A. Wade, ticket clerk at the Southern Pacific Pier, Oakland, California, with this essay:

> Courtesy costs nothing, yet it enriches all.
>
> Across the little square in my ticket window, studies in human nature pause and pass on, each going somewhere and eager to get there. One has but a moment in which to serve and the quickest avenue, is thorough courtesy. Our Oakland Pier is a world all its own. Here is life—joys, anticipations, disappointments. A timid old couple on their way to their daughter—a foreigner who doesn't understand and patiently meets all trains until he finds his "Rose Marie"—a grandfather to meet his first grandchild, just has to tell some one. A smile brings understanding. And so the throng passes on.
>
> There is no mood so ugly, no heart so hard, no soul so sad that will not melt under the spell of courtesy. People's travel difficulties are usually not large. They only seem large to them.
>
> To make friends, be friendly. It's the individuals who make a railroad. Make our road a friendly road and its fame will travel far. Be happy to serve and the public will come again to be served.
>
> But really, it's fun just to smile and see the "Thank You" smile returned.
>
> "A pleasant journey to you"—And you've made a friend for your road.
>
> Yes! Courtesy costs nothing!

Safety for Marine Workers

Marine Section of Third Annual Pacific Coast Safety Congress Produces Some Very Interesting Papers

Broken hatch covers, a frequent cause of maritime casualty

DURING the week of August 30 to September 4, the Third Annual Pacific Coast Safety Congress was held in the Exposition Auditorium in San Francisco. The entire week was devoted to meetings of delegates from all parts of the United States, and many different aspects of the work of accident prevention were discussed.

For the first time in the history of a Pacific Coast Safety Congress, the subject of safety for marine and longshore workers was considered. The fact that the waterfront interests in San Francisco are preparing to make accident prevention a part of their work led to an entire session devoted exclusively to this subject. The chairman was Captain W. J. Peterson of the Waterfront Employers' Union and papers were presented by the following:

J. J. Rosedale, consulting safety engineer for the Shipowners' Association of the Pacific Coast, The Pacific American Steamship Association, and the Waterfront Employers' Union.

M. E. Arkills, safety engineer, Waterfront Employers Association of Seattle.

Monroe C. Kidder formerly with Chas. Nelson Co.

W. H. Pillsbury, formerly attorney for the Industrial Accident Commission of California.

The papers of Mr. Rosedale and Mr. Pillsbury are reproduced herewith. Those of Mr. Kidder and Mr. Arkills are deferred for space reasons and will be printed in full in the next issue of Pacific Marine Review.

Introducing Safety to the Shipping Industry

By J. J. Rosedale, Consulting Safety Engineer.

SAFETY work in the shipping industry is practically an untouched field. There are, however, one or two outstanding attempts along these lines in the United States which have met with a measure of success, and of these the work of the Welfare Committee of the Lake Carriers' Association merits special attention as pioneering this movement.

In 1917 (when this country was at war and the government was depending on this arm of transportation on the Great Lakes for conveying the needed iron ore and grain) owing to the lack of qualified man power from which all industries were then suffering, a large number of personal injuries prevailed. It was then decided that a properly organized safety program was as essential to steamboat operations as to any other industry, and a plan was worked out by the Lake Carriers' Association. After several years, this work on the Great Lakes showed a reduction of 40 per cent in the cost of accidents and about 80 per cent in the number of fatal accidents.

The shipowners of the Pacific and Atlantic had been looking upon this experiment on the Great Lakes very skeptically and insisted that it could not be done for their operations as they were different from the operations on the Great Lakes. Finally, however, in 1924, the safety movement was launched on the Pacific Coast by the Waterfront Employers' Association of Seattle, and their safety department has been operating with great success, with a reduction of about 30 per cent in accidents to their credit. The Shipping Federation of British Columbia has also instituted a safety department and has reduced its accidents about 30 per cent.

The shipping industry of California, realizing the success of the movement on the Great Lakes and in Seattle and that the cost of insurance covering personal injuries had increased considerably, determined to make a safety survey in order to discover the commonest causes of accidents, with a view to devising ways and means for their elimination. It was decided to devote six months to the survey, after which a permanent safety program, based on the findings, would be launched.

Since other industries have proved that the best results are accomplished by having an outside expert, a safety committee from the three associations, The Shipowners' Association of the Pacific Coast, The Pacific American Steamship Association, and the Waterfront Employers' Union, agreed to employ a consulting safety engineer, with a full time assistant, to make a complete survey of the shipping industry of California, both ashore and afloat.

The first step taken by the engineers was to send out a questionnaire to the members of the three associations. The purpose of this questionnaire was to find out if the shipowners had any proper method of making out accident reports and keeping records of the cost and the number of accidents.

Only a small percentage of replies have been received and it was found that only a few of the larger concerns have adequate records, while the majority of shipowners have no records at all, as their brokers handle all personal injury cases. For this reason, it was found difficult to gather statistics on accidents in the shipping industry.

Program of Survey.

Inasmuch as shipowners in general are rather doubtful of the success of any safety program for the shipping industry, we are endeavoring to carry on a campaign of education and to sell the idea of safety to the management, first.

The program of our survey, therefore, with a view to establishing a permanent safety department, includes the following:

1. To analyze the accidents which have occurred in the past two years and determine methods of preventing recurrences.
2. Inspections of ships and dock operations, with a view to uncovering existing hazards and unsafe practices.
3. Study of personnel to determine the fitness of employes for their jobs.
4. Issuance of safety bulletins to the shipowners, with the idea of convincing them of the worth of the movement.

Classification of Accidents by Cause.

After studying the situation since the middle of June, when this survey was begun, and analyzing the reports of 2608 accidents, we have arrived at the following classification and percentages:

Hand handling cargo	19.8%
Machinery and ship's gear	23.1%
Falls and falling objects	29.1%
Trucks and tractors	4.7%
Burns	2.3%
Hernia and strains	3.8%
Nail punctures	1.1%
Infections	1.5%
Miscellaneous	14.6%

Examples of Avoidable Accidents.

In studying the causes of accidents, we found that one company had had three serious accidents due to having removed the hatch covers and covered the openings with loose tarpaulins. One of these accidents cost $20,000. The same company had three additional serious accidents within two years due to the custom of leaving hatch beams loose, and in one case as a sling load came out of the hold, it struck the loose beam and threw the hatch tender and the beam down the hold. One of these accidents cost $12,000.

Another recent accident was due to a man being struck on the head by the pennant when a guy carried away. The supercargo remarked in filling out the report, "The gear was in good condition up to the time of the accident."

Other examples are cited as follows:

Chinese seamen were lowering a boom while men were working below. The boom dropped, striking one man and breaking his back. This accident could easily have been avoided by using the proper method of lowering the boom.

Five or six loaded freight cars had to be moved and a line was brought from the gear and attached to the string of cars. The load on the gear was so great that the boom broke and several men were seriously injured. The cost of this accident was heavy. Improper use of the gear was the cause of this accident and it was due either to ignorance of the strain imposed or to carelessness.

A boom was to be lowered and the man assigned to check the travel of the load did not take a sufficient number of turns around the gypsy head. Consequently the boom got away from him. The winch driver jumped down to help him, caught his foot in a turn of the line and was jammed on the gypsy. He lost his foot and a suit for a large sum is pending. The accident was due to ignorance on the part of the man handling the line.

Unavoidable accidents are relatively surprisingly few in number, and there is no reason why a well thought out safety program cannot function in the shipping industry as well as in other industries. There has always been a certain amount of indifference and resistance to be overcome in launching a safety program.

The steel industry used to be the most hazardous, and see what has been accomplished! The construction industry is considered among the most hazardous, and it is only very recently that contractors have come to see that much can be accomplished by intelligent safety supervision of every job. This field has only been touched, but it has been demonstrated to the satisfaction of all concerned that large buildings can be constructed without fatal accidents and that compensation costs can be reduced by safety methods.

The shipping industry has many safety problems in common with other industries and of course some special problems, but it is possible to make a big reduction in the number of personal injuries, thereby saving money to the shipowners and saving life and limb for the employees both on vessels and at the docks.

Plans for Permanent Program.

Our tentative plans for a permanent safety program include:

Devising a standard form of accident report for the use of shipowners.

Organizing safety committees on ships and at the docks.

Periodic inspections of ships at the main ports by the safety department.

Having each ship make out a report before landing at the dock, showing the condition of all equipment on the ship. Such a report is to be sent to the operating manager and a copy to the safety department.

Organizing of first aid teams or teaching first aid on board ship and to stevedores on the dock.

Occasional first-aid meets with competition between teams.

Organizing a safety school for stevedores and ships' personnel.

Issuing of safety bulletins to ships and stevedoring employees.

The shipping industry is one of the oldest of industries, and in ancient times the men who followed the sea took pride in their calling and were mostly efficient and careful. The changes through the years have brought about complicated conditions of shipping and a very different class of seamen and stevedores.

It is now necessary to adopt scientific methods in providing safe working conditions and in training men in safe practices. This can be accomplished if management will earnestly back this movement by proper financing and cooperation. It is hoped that the program for the shipping industry of California will be carried on and that in a few years we shall be reading a report similar to that of the United States Steel Corporation. Nine million dollars expended for accident prevention work for a period of ten years brought about a money saving of over fourteen million dollars, while 250,000 men were saved from personal injuries and some 40,000 from fatal injury.

The Law of Maritime Injuries

By Warren H. Pillsbury, Formerly Attorney for the California Accident Commission.

IN the course of a short paper it is possible only to give a brief outline of the law respecting rights and liabilities growing out of injuries in maritime employment.

It should, however, be of advantage to the safety engineer to consider the laws creating liability for maritime industrial injuries. The safety engineer has three functions: (1) To protect the workman against loss of life and limb; (2) to protect the employer against loss arising out of such injuries, and (3) to keep the employer within the law with respect to the supplying of safe working places for his men.

Going back to Colonial times, two radically different systems of law were brought to bear upon injuries to seafaring men—the common law and the admiralty law. The common law was enforced in the local courts and applied to all injuries occurring in local waters. The admiralty law applied to ships, especially when away from home upon voyages. An injured mariner had his choice of suing in either the local or admiralty court and of applying either system of law.

Constitutional Rights.

When the United States Constitution was adopted, it was wisely determined to vest in the federal government full power and authority over all matters of a national or international nature, including the regulation of interstate and foreign commerce by land and water and the regulation of maritime matters. One provision of the federal constitution gives power to Congress to regulate interstate and foreign commerce. This clause has been construed to extend to the regulation of all injuries sustained by employes while engaged in interstate and foreign commerce. This power extends to both land and water carriers, to railroads, and to shipping. Under it, Congress may pass laws allowing or improving a right of action for injury or death, and it has done so for railroad employes in the statute commonly known as the Federal Employers Liability Act, enacted in 1908. This statute will be discussed later. Under the commerce power, however, Congress can pass no law regulating injuries occurring in local commerce; that is, commerce not interstate or foreign, whether by land or water.

The other clause in the constitution vests power in the federal courts to determine all cases of admiralty and maritime cognizance. This power is not limited to interstate commerce injuries, but applies to all accidents occurring upon navigable waters, whether upon the ocean, in ports and harbors, or on interior rivers. The courts have interpreted this grant as extending to all injuries occurring upon navigable waters only and not to injuries occurring upon the wharf, dock, or land. Accordingly, when a stevedore is hurt on a ship, he may sue under the admiralty law, but if he is injured on the wharf or shore end of a gang plank while engaged in the same service, the State Workmen's Compensation Act applies. State of New York vs. Nordenholt Corporation, 259 U. S. 263. Which law applies where a stevedore is in the middle of a gang plank at the time he is hurt, or when he is standing with one foot on the boat and one foot on the dock, has never been decided.

Federal Courts.

When the federal courts were first organized in 1789, it was provided in the Judiciary Act which defined their jurisdiction that the United States District Court should have exclusive jurisdiction over all cases in admiralty "saving to suitors their remedies under the common law where the common law was competent to give a remedy." This provision, commonly known as the "saving clause" has the effect of allowing an injured maritime worker to bring a libel suit against the ship or its owners in the admiralty court or to bring an ordinary damage suit in the state court, at his option. Only the admiralty court can use the characteristic steps sanctioned by the maritime law; that is, the use of the liability **in rem** or **in personem** and the enforcement of a maritime lien. If suit is brought in the state court, the state procedure must be applied.

State Courts.

It was, for many years, supposed that where suit was brought in the state court under the "saving clause," the provisions of the state law with respect to the liability of the employer were to be applied and that the somewhat different provisions of the admiralty law could be applied only if the suit was in the federal admiralty court. For instance, the rule of the admiralty law is that where the seaman is partly at fault with respect to the cause of his injury, the damages are divided, he being entitled to only half of the damages otherwise recoverable. If suit is brought in the state court, the rule of contributory negligence bars all recovery where the seaman is in any way at fault. In the recent case of Chelentis vs. Luckenback Steamship Company, the United States Supreme Court decided that while suit may be brought in either court, the admiralty law is the rule of decision in each, binding upon the state as well as the federal courts. This decision makes for greater uniformity of practice, but is less favorable to the injured person, because of the antiquated condition of the general maritime law.

Osceola.

The first of the maritime decisions establishing the present rules of maritime law is the Osceola, 189 U. S. 158. In this decision, handed down in 1902, the United States Supreme Court, for the first time, clearly defined the rights of an injured seaman. It was there held, (1) a seaman who is injured or falls ill in the service of a ship is not ordinarily entitled to damages, even though the injury may be the fault of the vessel, and can only claim his wages until the end of the voyage and his full medical, surgical, and hospital treatment. Such medical, surgical, and hospital treatment is now furnished by the Marine Hospitals. (2) Where, however, the injury is caused by the unseaworthiness of the vessel, an action for damages can be brought in admiralty.

This test of seaworthiness appears, upon its face, to be a characteristic feature of the admiralty law, but in fact is, instead, the "fellow servant" doctrine of the common law under a different name. Under it, the vessel and its owners are not liable for any injury caused by the carelessness of a fellow employee, including the ship's officers, nor for the improper use of the ship's equipment by them. Liability exists only where the vessel or its owners have omitted to supply a safe vessel or safe equipment. For instance, if a vessel supplies a rotten rope or a dangerous winch, the ship is unseaworthy as to these articles and is liable in damages for any injury growing out of their condition. If, however, the ship's officers allow a safe winch to become unsafe through their neglect, or the crew use safe equipment in an unsafe manner, the ship is not unseaworthy and no recovery can be had.

This doctrine of unseaworthiness is not limited to the condition of the hull, as pointed out above; it includes unsafe working equipment of all sorts; it even includes the furnishing of a brutal mate, so that where a man is injured through the brutality of such a mate, the ship is unseaworthy as to that officer and damages can be recovered. The Rolph 293 Fed. 269.

The rules of the Osceola, quoted above, apply only to non-fatal injuries. The admiralty law, like the earlier common law, never made provision for death resulting from the negligence of another, and it is only under modern statutes that a suit can be brought for a fatal injury. As the different states have all passed statutes allowing a right of action for wrongful death, it was natural that the admiralty courts should adopt such state statutes as part of the admiralty law in death cases. Here, then, the state law applies instead of the admiralty law, and such state law may be enforced even in an admiralty proceeding.

A somewhat later case, Atlantic Transport Co. vs. Imbrovek, 234 U. S. 52, very widely extended the application of the admiralty law to injury cases. Up to that time, it had been supposed that the rules of the Osceola applied only to seamen and only in cases where the suit was against the vessel or its owners. To illustrate, there should be no reason for a suit in admiralty in the case of one passenger shooting another upon a ferryboat or of a landsman, bathing in the bay, who assaults another bather while swimming in the water. The admiralty law was created to promote the operation of ships and shipping. The admiralty law has, however, been extended to most wrongs committed on navigable waters and in the case stated it was held that it applies to all injuries occurring on board a vessel in the course of its operations, whether the injured man was employed by the vessel or its owners or by a land contractor.

La Follette Act.

By Section 20 of the La Follette Act, passed in 1915, Congress endeavored to repeal the fellow servant rule in admiralty cases (in effect the doctrine of unseaworthiness discussed above) by providing that seamen having command should not be held to be a fellow servant of the injured seaman. The United State Supreme Court held, however, in the Chelentis case cited above, that this did not mean anything, as a seaman is entitled to cure and maintenance without regard to the negligence of the employer under the Osceola rule, and not to damages.

The antiquated state of the maritime law led to the application, by the different states, of their workmen's compensation acts to maritime injuries as soon as these statutes were passed. Some shipowners and insurance companies successfully fought the extension of these state laws to admiralty cases; but have since found that they would have been much better off had they not done so. Much of the confusion and heavy loss existing today are due to the extension of damage suit laws to maritime cases because of the failure to bring these employments within compensation acts.

The first case involving the application of such compensation acts was Southern Pacific Company vs. Jensen 244 U. S. 205. This case holds, that the (alleged) characteristic harmony and uniformity of the general maritime law cannot be impaired by the statutes of the different states. It recognizes that state statutes allowing a right of action for wrongful death may apply; but refuses to permit the application of state compensation acts in death cases or otherwise.

This decision was promptly changed by an act of Congress (Act of October 3, 1917) commonly known as the Johnson amendment, by which Congress authorized the application of state workmen's compensation acts to all maritime workers. The United States Supreme Court, however, in Knickerbocker Ice Company vs. Stewart 253 U. S. 149 held this act unconstitutional, stating that it was not within the power of Congress to surrender any portion of the maritime law to the control of the states.

In 1920 Congress again endeavored to make state workmen's compensation acts applicable to maritime workers, this time limiting the effect of the act to port and harbor workers, as sailors had been taken care of by another statute passed at the same session—the Jones Act. It was believed that as the general maritime law had not historically applied to port and harbor workers, the effect of the Jensen decision could be overcome by this differentiation, and port and harbor employments placed on the same basis as all other industrial workers of the state in land employments. This act was again held unconstitutional, however, in Industrial Accident Commission of California vs. Rolph, 44 Supreme Court 302. This ended the attempt of Congress and the different states to bring maritime workers under state compensation acts.

Another important decision of about the same time was Grant Smith Porter Ship Co. vs. Rohde 257 U. S. 469. In this case, a carpenter was employed by a ship construction company to work upon a vessel which had been launched but had not yet been completed and turned over to its owners. Being injured upon the vessel, he brought suit for damages in admiralty. The ship owner claimed the protection of the Oregon Workmen's Compensation Act. The United States Supreme Court held (1) the injury occurring upon navigable waters, the admiralty law would normally apply; (2) the rendition of services to an uncompleted vessel was local in character and did not affect the characteristic harmony and uniformity of the general maritime law and there was therefore no objection to the application of the State Compensation Act; (3) the parties having elected to come under the Oregon Compensation Act, such election was binding upon them. Rohde was accordingly denied relief in admiralty. This decision has been expanded by later decisions of state courts to include the following injuries occurring upon navigable waters in persons in semi-maritime employments; the driver of an oil truck injured while unloading barrels of oil onto a barge, a diver working in navigable waters removing obstructions to navigation, a diver working upon the launching ways of a ship construction company, an employee of a municipal dredger engaged in harbor improvements. It is uncertain how much further this doctrine will be extended.

An Act of Congress of March 3, 1920, provided a federal remedy for wrongful death occurring upon the high seas, thus filling a long felt omission in the admiralty law. This act does not apply, however, to fatal injuries occurring upon vessels in ports and harbors or inside the three-mile limit in which case state death statutes still apply.

The Jones Act, also passed in 1920, radically changes the rights of seamen. By Section 33 of this Act, the Federal Employers Liability Law, passed in 1908 for the protection of railroad employes injured in interstate commerce, was extended to seamen. An injured sailor or his executor or widow now has the choice of suing for damages for unseaworthiness, under the rule of the Osceola, or of bringing suit in the state or federal courts under the Employers Liability Act. This statute has been held not to extend to stevedores and other port and harbor workers, but only to sailors.

Several bills have been introduced in Congress to provide a uniform federal workmen's compensation act for maritime workers. The Cummins Bill passed the Senate last fall, and may receive favorable action this spring in the House.

The principal measures now before Congress are defective, in that they apply only to stevedores and other port workers and do not extend to sailors. There is no reason for this distinction, and such laws should extend to all maritime workers. The reason for the failure to include seamen is that the president of the international seamen's union persistently refuses to support the inclusion of sailors unless they are given the choice of damage suit or compensation after an injury, a right to which they are not entitled.

Summarizing the present state of the law:

1. Injuries occurring to sailors, stevedores, and others upon the dock or shore are governed by the state law and not the admiralty rules. Industrial Commission of New York vs. Nordenholt Corporation 259 U. S. 263; Todahl vs. Sudden & Christenson, 5 Fed. 2nd 463.

2. State workmen's compensation acts cannot be applied to any injuries occurring in maritime employments on board a ship, except to employments local in character and not directly concerned with commerce and navigation. Southern Pacific Company vs. Jensen 244 U. S. 205; Grant Smith Porter Ship Co. vs. Rohde, 257 U. S. 469.

3. Fatal injuries occurring upon water are governed by the negligence laws of the state in which they occur, if occurring within the state. If occurring upon the high seas or in foreign ports, by the Act of Congress of October 3, 1920. In case of a fatal injury to a seaman, the relatives have a choice, also, of suing under the Jones Act (Federal Employment Liability Act), but this choice does not extend to port workers.

4. For nonfatal injuries occurring upon navigable waters, a stevedore may sue under the rules of the Osceola, claiming cure and maintenance. If he can prove the ship unseaworthy as to hull, crew, or equipment, he may also sue for damages. A sailor has the same rights and, in addition, may sue under the Jones Act.

5. Where a suit may be brought under the state law, there still remains the question of what state law is applicable. In California, the Workmen's Compensation Act is the state law to be applied, repealing all other state laws. In Oregon, where there is an elective state compensation act, such act applies to land injuries where the parties have elected to come under the act and are making contributions to the Oregon state fund. If they have not so elected, the state law to be applied is the general law of responsibility for negligence, whether resulting in death or not.

The Oregon Supreme Court further holds, under the authority of Grant Smith Porter Co. vs. Rohde, that the Oregon Act may be applied as an elective act to injuries sustained by stevedores injured upon the vessel. This has not been extended to sailors.

In Washington, the situation is more complicated. The legislature originally extended the compensation act to all maritime injuries. Following the Jensen case, the state courts held that as the law cannot be extended to injuries occurring upon water, it could not be extended to any maritime injuries, as no method had been devised for dividing insurance premiums between land and water operations. The legislature thereupon authorized the extension of the act to land injuries in stevedoring operations where the land and water payrolls were clearly separable. The Washington Commission made the ruling that where stevedores are employed at single wages for services intermittently performed upon the ship and dock, the payroll should be divided equally for the purpose of compensation insurance for the land side of the operations. The court held this division unwarranted and the State Compensation Act inapplicable to land injuries occurring under these circumstances. The legislature has now amended the law to authorize the Washington Commission to make an arbitrary division of payroll in such cases, so that land injuries occurring in stevedoring occupations are now within the Washington Compensation Act.

The Limited Liability Act, authorizing limiting of liability in case of loss of vessel, has been held to apply to maritime injury claims, even under the Jones Act.

Safety Regulations.

A few remarks may be added concerning the safety side of maritime regulations. The La Follette Act, in 1915, contained many requirements concerning lifeboats, life preservers, etc., but did not otherwise deal with the maintenance of a safe place of employment in maritime work. Federal regulations of hulls and boilers cover quite thoroughly matters of safety relating to these topics, but do not extend to the safeguarding of machinery generally or to stevedoring operations.

In the recent case of Robbins Dry Dock & Repair Co. vs. Dahl, 45 Supreme Court, 157, the Federal Supreme Court held that a violation of the state scaffolding law cannot be introduced in evidence in a damage suit to prove negligence of a shipowner in maintaining an unsafe scaffold on a vessel. It is safe to say that no state safety statute or safety regulation can be made applicable to ships and shipping.

The following remedies should be considered, for relief:

(1) Prompt passage of an adequate and proper federal workmen's compensation act, applying to all maritime workers, including seamen.

(2) Intensive safety work to reduce injuries in maritime employments.

(3) More adequate insurance protection, particularly insurance protection under local control which will be in touch with the local conditions and have the intensive cooperation of local shipping interests in accident reduction and medical supervision of injury cases.

News from the South Pacific

By Our Special Correspondent.

THE arrival in Sydney of Hugh Gallagher and J. E. Brown from the Matson Line's San Francisco office aroused much public interest in view of the recent purchase of the Oceanic Steamship Company by the Matson Navigation Company. The announcement that Mr. Brown would remain in Sydney to manage this end of the business in place of Mr. Sproule, who has resigned, was another fillip to public interest, which had previously been quickened by the appearance of the old Oceanic liners under Matson colors.

Naturally rumor has been active, and one of the most persistent reports is that the Malolo is really intended for the Sydney trade. This, however, has been officially contradicted by Mr. Gallagher, who told the press that until the whole situation had been thoroughly reviewed there would be no change in the running or the fleet of the Oceanic service.

Mr. Gallagher intends to visit Melbourne, the second biggest city and port of Australia, which is anxious for the line to extend to its docks. He will also visit Queensland, the great northern state, and New Zealand. It is possible that Auckland, in the north of New Zealand, or Brisbane, in the south of Queensland, will be made ports of call en route and Melbourne made the Australian terminal. Negotiations have frequently been afoot to have the Melbourne call introduced, but hitherto the fast schedule has prevented it. To make the line pay, more ports must be called at in the South Pacific unless large liners are put on which will create their own tourist traffic.

Sold to South America

Two Australian interstate liners, the Levuka and Wyreema of 6000 tons register, sailed recently for Rio de Janeiro, where they will in future ply in the services of the Brazilian Lloyd Company, which purchased them from the A. U. S. N. Company. Before sailing they were re-named Don Pedro II and Don Pedro I, respectively, their funnels were repainted, and the new house flag and Brazilian flag hoisted. With full cargoes of coal they sailed together, their course being through Straits of Magellan. Skeleton crews of Brazilians, with captains and officers arrived to take the ships away. But there were still vacancies, and for days the offices of the Brazilian Consul were besieged by men who wanted a passage to South America. These were mainly Brazilians or Portuguese but there were Anglo-Saxons too. One party of Liverpool firemen signed on, in the hope of getting a ship at Rio, so they said. But it turned out to be just a ruse to draw a month's pay, about twenty dollars. The men did not return to the ships once they got away.

This is the first time that large passenger steamers have been sold to South Americans. Often the old ships go to China; just recently quite a flotilla of old steamers have taken Chinese names and sailed for the East where new owners will make the best of old ships. China has always been a good market for old Australian steamers.

Shortage of Interstate Steamers.

The ruthless reduction of the fleet of steamers trading between the Australian states, the coastlines of which are most extensive, has been prompted by a desire to get out of the passenger business, with its irritating strikes and other hindrances. Since 1914, no less than thirty-seven steamers have been sold, lost, or laid up and only one new one has been built. In the same period the cargo steamers working the Australian coast have increased over forty ships. The railways are supposed to carry all passengers, since the overseas steamers, unless on Australian articles, are not permitted to trade between Australian ports except in special circumstances. Today there are only twelve passenger vessels on the coast, and the only outside ships which are allowed to carry passengers in Australian waters are the Commonwealth Government liners, which carry Australian crews. Since the gold rush has broken out in New Guinea and hundreds of men are seeking quick transit to the scenes, the lack of steamers is becoming serious.

Gold Galleons From Australia.

Seldom if ever in the history of the Pacific has so much gold in the form of sovereigns been shipped from Sydney to San Francisco. The Sonoma, which carried Miss Australia to the United States, also carried 1,000,000 sovereigns, and the Tahiti, the next ship to sail, also took specie of that value. Much publicity was given to these shipments in the newspapers, and since the Tahiti's departure the government has asked the press not to refer to the shipments till they have gone to sea. The fear of a hold-up ashore prompted this step. There appears to be no fear of a hold-up at sea. But are the days of pirates really past? With no more guard than the ship's crew and whatever arms they may carry, the liners, both American and British, put to sea with enormous wealth in their strong rooms. No doubt wireless is their best protection, though in the war days, the raider Wolf always managed to silence her victims' wireless before she captured them. The gold galleons of Spain sailed the Main secure in the might of Spain—till Drake and others happened along. It is a great tribute to the peaceful condition of the world and the power of America in the Pacific that the golden galleons of today can safely traverse 6000 miles of sea with wealth of gold in their holds.

Holder of South Seas Record.

Recently the question of which steamer held the record across the Tasman Sea to New Zealand and on the Australian coast has arisen. It was started by the claim of the Tahiti to have made a record run to Wellington. It then transpired that the Maheno, the first turbine ship to cross the Pacific, and a ship which ran in the New Zealand-San Francisco service for some time, still holds the records between Melbourne and Sydney, Sydney and Wellington, and Bluff to Hobart. All these were run when the Maheno came out, a new ship, in 1905, and were achieved at a speed of 18½ to 19 knots. Even the motorship Aorangi has not yet lowered the Maheno's figures, though she tried on her last trip down. A strong easterly set, however, conspired with head winds, to check her fast progress. It was thought that the Maheno had lost her turn of speed. Now, however, as though retelling of her old glories had given her new life, the ship has begun to run fast trips again, getting up to speeds of 16 knots with coal fuel.

Mathematical Marine Appraisals

IF the experience of all who appraise vessels covered parallel activities, and if the respective individual judgments of all appraisers were equally sound, then all appraisals would be approximately the same. However, the fact is that a wide variation in amounts is frequently encountered in two or more independent appraisals whose signers are equally entitled by reputation and experience to the adjective "qualified." The result is that those very persons whom it is intended to enlighten are actually perplexed; and reports of appraisal have assumed the characteristics of certain other classes of expert testimony, testimony that serves not to clarify an issue, but to befog it. This is an unfortunate condition. That experts may differ regarding the sanity of a human being is easily understood; but the value of a vessel is surely capable of determination by experts within reasonable limits.

No method of appraising can be devised wherein the judgment of the appraiser is entirely eliminated. Consciously or otherwise, the appraiser combines facts with assumptions and to the combination applies his judgment. Thus he works according to a formula containing three factors, two of which are variables. It would therefore appear that the reason for the spread in independent appraisals is due to the differences in quantity and/or accuracy of the data in the hands of the respective appraisers; or to the unequal soundness of the respective assumptions; or to the unequal soundness of the respective judgments; or to a combination of two or more of these.

The ideal method to be used in arriving at an appraisal is one in which the variables are reduced to a minimum. In addition to insuring the accuracy of the result, the use of such a method lifts an appraisal out of the unfortunate "ipse dixit" class of expert testimony; and offers to those interested an opportunity of checking the result arrived at by the appraiser. Frank W. Hibbs has devised and used such a method, a brief outline of which will be given; its accuracy and reliability have been frequently tested and checked by comparing the appraised value of a vessel with her actual sale price. The method is practical and it does work.

Accurate Data Necessary.

Description and general remarks should be prefaced by the statement that obviously any method depending upon the use of data naturally demands the possession of accurate pertinent data in sufficient quantity. For appraisal work, such data cover the cost of construction of vessels of various classes at the shipyards of the world's ports; the cost of materials, of labor and its varying efficiency; the tons of steel in a vessel; and the cost of propelling machinery of every type measured by horsepower or by the ton; and the sales prices of vessels in the various markets.

In the appraisal of a vessel there are three general items demanding consideration, A, the intrinsic value; B, depreciation; and C, the market conditions, all at the place and date of the appraisal. In the discussion, the date and place of the appraisal are to be understood as always applying, as is also the stated condition of the vessel, usually "sound condition."

The intrinsic value depends upon two things: (a) the cost of duplication and (b) the earning ability of the vessel. It is obvious that this intrinsic value cannot be the appraised value due to the fact that the items of market condition and depreciation have not been included therein.

Depreciation cannot be ignored. It is ordinarily handled by the application of a percentage figure which has been found applicable to the class of the vessel under consideration. Sometimes in particular instances it is necessary to change this figure; based as it is upon the assumption that the vessel and its equipment have been maintained in an operating condition, the reputation of some owners demands its correction, either plus or minus. Periodic reconditioning, renewal of worn or obsolete equipment, major casualties, all these should be reflected in the figure used for depreciation.

The condition of the market responds to the law of supply and demand and is the third general item entering into the proposition. This law affects the appraised valuations of all classes of vessels; not having the same effect upon each class, however, as each has its own market and governing condition. This problem at first glance seems to be complex—too complex for the classification of data to be of any use. For instance, the Shipping Board sales and the potential sales represented by Shipping Board tonnage have long exercised a dominating influence in the United States market. This fact alone is sufficient to demonstrate that the world market and the United States market must be considered as presenting two different conditions. Forced sales by private owners, Shipping Board sales for dieselization, junk and scrap sales, these of course are to be ignored and are not to be considered as indicative of the state or trend of any market. Due to the smaller number available for disposal, tankers have suffered least of all from Shipping Board sales and policies. Pacific Coast steam schooners are in an extremely sensitive market which fluctuates with the current lumber movement and rate, the price of fuel oil, labor charges, and insurance rates. These items affect the earning ability of the vessel of this class, which in the case of the small specialized class is reflected both in the market condition and in the intrinsic value. How the market condition is taken care of is explained later.

Intrinsic Value.

Estimating the cost of replacement of a certain vessel as of a certain date and place is not a particularly difficult job for the naval architect who has preserved his files. The construction of a ship covers labor, material, overhead, and profit. From the known characteristics of the vessel to be appraised can be deduced the tons of steel in her hull. Records of steel prices and fluctuations, prices of various types of propelling machinery, labor costs, and the efficiency of shipyard labor are items that bear upon the subject, and the appraising agent turns back his calendar and proceeds to estimate the cost of the vessel as of the date desired in exactly the same way that he would go about estimating the cost of the vessel as of the current year.

Curves showing relative variations in costs of labor, materials, and propelling machinery over a period of years are found convenient. The compilation of data represents a large amount of work, but once completed the curves are easily kept up to date. As information known to be accurate comes to hand, it is subdivided, classified, and plotted. In addition, the exact costs of various vessels, when learned, are filed for future reference, the cost subdivided and plotted as check spots on the curves.

Replacement Cost.

The replacement cost as finally determined must include any and all special features which distinguish the vessel from the average or standard vessel of her class and size. The consideration of such features cannot be haphazard. For example, teak woodwork, hand carved, will increase the cost of a freighter but will add nothing to its earning ability. On the other hand, diesel engines will also increase the cost but will add greatly to her earning ability on most routes and should affect her appraised value. All such features must be considered with a view as to their respective effect upon the vessel's earning ability.

Market Factor.

Consideration of the state of the market sequentially follows the determination of the replacement cost. Sales of vessels are being made in the various markets every day. Sometimes the sales prices are not given out; others as given out are purposely fictitious; but sufficient bona fide sales are given out with reliable figures to serve the purpose desired.

Knowing the age of a vessel at the time of her sale, we can apply the depreciation incident thereto to the sale price; appreciating that figure by the amount of the depreciation will result in the price which the world market considers such a vessel worth when new. This method is the only fair one that is available.

The "curve of market factor" is then obtained by plotting, in terms of percentage, the ratio between the appreciated sale price and the cost of replacement. In such a curve, the percentages are the ordinates and the dates of sale are the abscissas. Curves must be plotted for each class of vessels in each of the principal markets; obviously the tanker curve will not apply to cargo vessels.

Appraised Price.

Reverting to the mechanics of the appraisal, we find that we now have in hand the cost of replacement of the vessel and the market factor, both as of the desired date. We then apply the market factor to the replacement cost, and to the result apply the depreciation percentage incident to age at the date required. This is the appraised price of the vessel as of that date in sound condition.

The method above outlined and discussed covers a systematic, technical, mathematical analysis of all information that would affect the valuation of a ship; and the accuracy of the results obtained by its use depends upon the amount and accuracy of the data in the hands of the appraiser.

Trade Promotion and Shipping

By R. V. Winquist.

R. V. Winquist, manager, Trade Promotion Department, General Steamship Corporation

TRADE promotion as related to the shipping industry is not, broadly speaking, a new activity. As early as the Phoenicians shipped their galleys to England for tin, they doubtless found a market for their dyes and discovered other trade possibilities. Instead of bringing their findings to the attention of the merchants at home, however, the information was retained by the shipowner for his own exploitation, for the shipowner of that day was also a foreign trader and he carried his own goods in his ships.

The essential difference, therefore, between trade promotion as carried on by the Pohenicians and trade promotion as carried on by a steamship organization of today rests on a basic development in foreign commerce —the separation of the carrier and the merchant. This change in the order of things is of comparatively recent origin. The common carrier as we know him today impartially handling the goods of many shippers without any financial interest in the merchandising of those goods, has come into being in the last century and a quarter. With ships plying to all parts of the globe and with extensive connections in all sections of the world, however, trade possibilities still come under the observation of the modern steamship operator. And having no direct interest in marketing, he is able to assist the merchants who use his ships by giving them the benefit of the information he thus receives.

Probably in no other field is there more room for work along trade promotion lines than on the Pacific Coast. The entire world seeks its products on a continually increasing scale. The improvement in existing steamship lines and the inauguration of new services touching this Coast reflect trade growth on a scale almost unbelievable in the otherwise depressed field of overseas shipping. Each of these developments finds, of course, new and wider markets and each presents its trade promotion possibilities.

Without doubt the most striking example of recent progress in our foreign trade field is found in our improved transportation facilities to the Argentine. Since the first of the year we have been brought fifteen days nearer the Plate market—the largest of South America, and we are now afforded a sailing twice a month. The present thirty-day running time compares faverably with that of the average cargo service out of the Atlantic or Gulf ports. The Pacific Coast merchant is thus placed in a position to compete not only in the marketing of lumber and canned goods, but also in many lines of manufactured items. The result has been an extraordinary interest in the potentialities of this market.

A similar situation exists with respect to the improved transportation facilities that are being offered for the Mediterranean countries, for African ports, for the Canary Islands, for Cuba, and for the East Indies.

Around the Pacific

DOWN under the Line on the broad bosom of the South Pacific lies that great, mysterious realm of Polynesia, where "float milky ways of coral isles and low lying endless, unknown archipelagoes" and great island continents. This region, until recently, has been known to the tourist public only as a very seductive influence in literature. The writings of Melville, Conrad, Stevenson, and a host of lesser lights have thrown around the South Sea Isles and the Malay Peninsula a glamor of mystery and a lure for adventurous spirits. But the difficulty and expense involved in penetrating these regions have in the great majority of cases forced the would-be traveler to get his East Indian thrills vicariously through the medium of Lord Jim, Treasure Island, Typee, Moby Dick, or any one of a score of South Pacific classics.

Guardians of the gate at a Siamese Temple high-hatting western visitors. The pictures illustrating this article were made from snaps taken during a recent tour of the East Indies and the Far East by Dan Sweeney, commercial artist of San Francisco.

During the past ten years much has been done toward placing this region on the map as a regular happy hunting fround for world tourists. American and Australian and New Zealand steamship companies have been rearranging their steamship routes, reconditioning old and adding new tonnage, establishing new ports of call, and arranging amicably to take care of combination routes to give tourists a comprehensive trip covering the most interesting and fascinating points around the South and West Pacific Ocean.

The new combination of Matson and Oceanic steamship services under one competent management has greatly strengthened these arrangements, and it is now possible for the tourist to arrange a trip from San Francisco by first class passenger steamers that will bring up in succession, with very generous stop-over privileges, all the beauties and delights of the South Seas and all the hoary mystery and ancient civilization of the Orient.

Leaving the Golden Gate, the journey commences with six days of restful sea voyaging to Honolulu, the American crossroads of the Pacific. Hawaii is so well known and its beauty and charm so well established that we will not pause there longer than to say that a stop-over of from ten days to three weeks will afford opportunities to tour the islands and get a very comprehensive contact with their life and its attractions. There is just one objection to stopping over at Honolulu on the outbound voyage—the fascination and lure of these islands are so great that many travelers give up the rest of the trip and spend all their time with the Hawaiians.

We, however, will fare southward "cross the line amid jovial festivities aboard, attendant upon the enthronement of Neptunus Rex and the initiation of his minions. Not long thereafter the purple peaks of Tutuila rise above the horizon" and soon we are gliding into the beautiful port of Pago Pago, the finest in Samoa, walled in by majestic mountains with square shouldered Rainmaker outstanding.

Several hours will be enjoyed at Pago Pago and, to the music of the official band (the Fita Fitas), we clear for Suva, capital of the Fiji Islands.

Fiji, a British crown colony, is a large archipelago of several hundred islands with a combined area greater than the Territory of Hawaii. Suva, on the island of Viti Levu, is the great focal port for Polynesian trips. Its steamer and motorboat connections radiate to every point of the compass. Viti Levu has good automobile roads along its coasts and broad navigable rivers reaching into the interior, affording ample opportunity for delightful motor and boat tours amid fascinating scenery and among an interesting native people. Incidentally, this is one of the finest fishing grounds in the world for game fish.

From Suva, ten days of leisurely voyaging on comfortable inter-island steamers will carry us to some of the most delightful and in-

A Batavian taxi and a Samarang truck.

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Shrines around the base of the Swe Dagon (Golden Padoga) at Rangoon.

teresting islands of all Polynesia in a triangle tour routed Suva-Apia-Nukualofa-Suva.

The capital of British Samoa, Apia, has become almost a literary shrine, for here, high on the slopes of Mount Vaea, is the tomb of Stevenson and here, at its base, still stands his manorial estate of Valaima.

Nukualofa, capital of the Tongas, is a bit of an entirely different world. The Tongas are ruled by native kings under a British protectorate and these islands are a treasure house of Polynesian history, folk lore, religious ritual, and relics of barbaric Polynesian life and mysterious prehistoric culture.

Another two thousand miles of voyaging brings us to that, considered by many travelers, most beautiful of all the world's harbors—Port Jackson with its lovely blue water, golden sands, and fair modern metropolis of the Antipodes, the city of Sydney. From Sydney there is open to the tourist all the continent of Australia and the Island empire of New Zealand.

Leaving Sydney, with the choice of several steamer lines, we fare north and west along the coast of Australia, inside the great barrier reef. Through Torres Strait, into the Arafura Sea, the Banda Sea, and the Sea of Java we steam lazily past New Guinea, Timor, Flores, Sandalwood, Sumbawa, and hosts of smaller islands clothed in tropical verdure and redolent of spices, history, and romance, and so steaming, we presently come to Surabaya, an energetic, hustling modern Dutch port on the Island of Java.

At Surabaya, we leave the steamer for a rail or motor trip overland to Batavia. Java, the "Garden of the East," has an area of 50,000 square miles and a population of 40,000,000. The roads are kept in splendid condition and automobiling is a pleasure. Scenery of unsurpassable beauty and grandeur, combined with some of the most imposing relics of ancient Hindu architecture and culture, are here opened up to the convenient inspection of the tourist. Java, "the peerless gem in the magnificant empire of Insulinde which winds about the equator like a garland of emeralds," is the ideal tropical island, the greenest, most beautiful, and most exquisitely cultivated spot in the East; in fact, the most picturesque and charming bit of the tropics anywhere near the world's great routes of travel.

At Batavia we again take the steamer and in forty hours land at the "City of the Lion"—Singapore, a great commercial shipping point, from which steamship lines radiate to all of Asia. Out to Colombo, thence up to Bombay and overland, across India, to Calcutta, then down through the Bay of Bengal to Rangoon, and so back to Singapore is one trip overflowing with interesting sights, sounds, smells, architecture, and ethnology. Another is up to Bangkok for a peek at the modern-ancient civilization of Siam, where the king rides out in a Rolls-Royce to partake in some ceremony, old before Magna Charta, staged in a temple with a roof of gold, surrounded by beautiful shrines of lacework carved in stone, with a wireless station on one side and an electric street car on the other. A third trip from Singapore is that into the beautiful scenery, wonderful ruins, charming modern ports, and interesting primitive civilization of French Indo-China. All of this southeastern Asia country is now open by modern, comfortable steamers and can be easily reached from Singapore.

Main temple of Singaraja, Island of Bali, the only Hindu island in the Dutch East Indies

Again we sail northward on what may be termed the homeward journey, and now we are on more familiar but still very interesting ground—Hongkong, Canton, Shanghai, with a possible trip up the Yangtze and the thrill of dodging bandits' bullets, Pekin, Seoul, Nagasaki, Kioto, Yokohama, Tokio, Honolulu, San Francisco.

The voyage around the Pacific, and especially that part of it lying south of the equator, is becoming more popular each year. San Francisco is the American gateway to this tropic paradise and affords numerous sailing dates and a good choice of routes. American world tourists will do well to consider the novelty, charm, and fascination of this wonderfully restful and interesting tour.

Some Aspects of Navy Purchasing

By Charles D. Snediker, Navy Purchasing Office, San Francisco.

Chas. D. Snediker

THE organization which has since come to be designated as the Navy Purchasing Office, San Francisco, was established somewhat less than fifty years ago. It operates under the direction of an officer of the Supply Corps, U. S. N., as Navy Purchasing Officer, in whom the final responsibility for all transactions rest.

The system in use is based on law (largely contained in Section 3709 et. seq., of the Revised Statutes) and the many regulations and customs which the experience of years have shown to be the most consistent with well defined purchasing principles; and while it may appear somewhat cumbersome at times, due to the requirements of various laws and the administrative interpretations thereof, the essential fact remains that it functions smoothly and efficiently at all times. The best proof of this is the fact that during the World War the Navy Department continued without change the system which had theretofore been in use and which is still in use today. It was vastly enlarged and expanded, to be sure, but it functioned perfectly during those strenuous years. It is not going beyond bounds to say that at practically all times in those two years the Navy had the materials it needed at the proper time and place.

Furthermore, these very rules and regulations serve as a double protection, both to the government and to the vendor. They safeguard the government from the "fly by night" type of vendor, the shoestring broker and others of their ilk, thus assuring all legitimate business enterprises of equitable competition, and they also save the vendor from any unhappy consequences resultant to a change in administrative officers, since the system—being impersonal and constant—is not affected by change in personnel.

The purchase of supplies for the Navy is handled on the basis of competitive bidding and in no other way except for articles of a proprietary nature, and even then it is often possible to secure such articles from more than one source, in which case proposals are issued to all who may be expected to supply them. The volume of such purchase is, however, comparatively negligible. The lists are open to legitimate manufacturers and dealers in their respective lines of business, subject to the necessary financial qualifications.

The department has prepared what are known as Navy Standard Specifications covering virtually all of the usually called for items. In these the standard of quality desired by the Navy is set and reference to the specification by number is made on proposals issued for any item covered by them. Goods offered must be at least equal in quality to that set forth in the specifications; they may be better but must not be poorer in quality in order to be accepted. It might be said in passing that many of these specifications, so far as technical requirements are concerned, are based on those promulgated by the Federal Specification Board and are gradually being brought into conformity with them, which means that in the course of time, for standard items, the manufacturer and the Navy will use the same descriptive language concerning a given item. In other words, simplified practice will be applied.

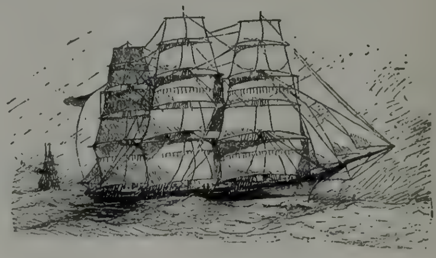
One of the most interesting phases in connection with Navy purchasing is the vast variety of materials required in the course of a year's time. If one will call to mind the number of activities of the Navy both afloat and ashore the idea will begin to appeal to him. With ships of all sorts, from battleships to tugboats and motor launches, and stations ashore, from the great navy yards at Mare Island and Bremerton with their thousands of mechanics, to the small radio compass station with a personnel of six to twelve men, their needs are many and varied and it is one of the functions of the Navy Purchasing Office to fulfill those needs so far as the stations within this district are concerned.

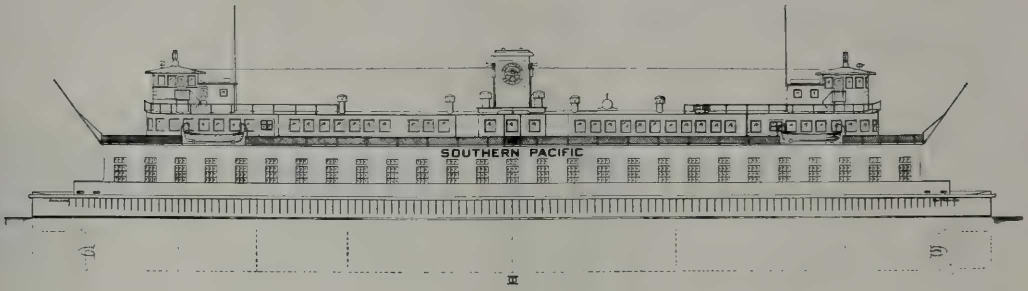
Indexes of major and minor classes of materials are maintained subject to continual revision, showing names of the principal vendors in their respective lines. Often a very innocent looking little item required by some yard or station may prove more baffling in its procurement than would a steam turbine. For instance, several years ago a requisition from the Philippine Islands contained a great many items among which was the following:

12 dozen sticks pith, packed 12 per bundle, ¼"x4".

That was all there was to it. As all know, pith in the common usage means that form of cellular tissue as found inside a stalk of corn. How the inside of a stalk of corn could be removed and made into sticks of these dimensions and for what imaginable use they could be, no one knew. Yet it had to be obtained for all that, and after considerable inquiry the trail led to the jewelry manufacturing trade. Upon investigation into that trade it was finally found that these articles could be, and often were, used in the final polishing of chronometer escape wheel staffs just before their final assembly into the jeweled bearings. The total value of the sticks was less than two dollars. It was the difficulty in obtaining them (and, incidentally, the information thus gleaned) rather than their value which rendered the transaction interesting.

To turn to the human side for the moment, in closing, the personnel of the Navy Purchasing Office is composed of a loyal and efficient force who serve their government well. All are highly trained; some might perhaps be termed specialists in their own work. The fact that it is government money—your money, if you like—which is being spent is never lost sight of.





New Diesel-Electric Auto Ferries

Union Plant of Bethlehem Shipbuilding Corporation, Limited, Building Three Steel, Vehicular Ferryboats to be equipped with Nelseco Diesel Engines and General-Electric Generators and Motors for the San Francisco Bay Service of the Southern Pacific Company

AFTER long investigation by the engineering department, the Southern Pacific Company has satisfied itself that the economy to be obtained by the use of the diesel engine, the pilot house control features, and the propeller economy to be obtained by the use of electrical transmission fully justify and demand the installation of diesel-electric power plants in its new ferryboats. The mechanical engineering department therefore prepared designs for a new type of automobile ferryboat based on the general hull lines of the double screw steam ferryboats of the Klamath class.

By slight alterations in the dimensions and arrangements of the main deck plan, this new ferry type will carry easily from 90 to 95 automobiles.

Three of this new type have been ordered from the Union Plant of the Bethlehem Shipbuilding Corporation, the order for the diesel engines and auxiliary machinery being placed with King-Knight Company of San Francisco.

The power plant is located amidships in two engine rooms. It consists of four 6-cylinder, 4-cycle mechanical injection, marine type Nelseco diesel engines, each directly connected to a 275-kilowatt 250-volt marine type General-Electric generator and mounted on the same shaft a 40-kilowatt 125-volt exciter or auxiliary generator.

These Nelseco engines generate 450 brake horsepower at 230 revolutions per minute, the cylinders being 15 inches diameter of bore and 22-inch stroke. Electrical energy from the four generators is supplied directly to two 1250-horsepower, double-armature, 1000-volt General-Electric motors. These motors are each directly connected to a screw propeller, one forward and one aft. The motors are located amidships, one at the after end of the after engine room, the other at the forward end of the forward engine room.

The motor driving the after propeller will operate at full power, while the motor driving the forward propeller will be operated with just sufficient power to drive that propeller at slip speed. It is proposed that on the trial trip of the first boat exhaustive tests will be made to determine the best relationship between the speed of forward and after propellers.

In designing these boats, especial attention was paid to the ventilation of engine room spaces and particularly to insuring that generators and motors should be operated in a current of cool fresh air. The idea of one amidships engine room hatchway was abandoned and two long narrow hatchways substituted. The incoming fresh air is brought down at the after and forward ends of these hatchways and practically delivered at the motors and generators in each engine room. This air then sweeps forward or aft to the center portion of the hatchways and so up and out through the stack.

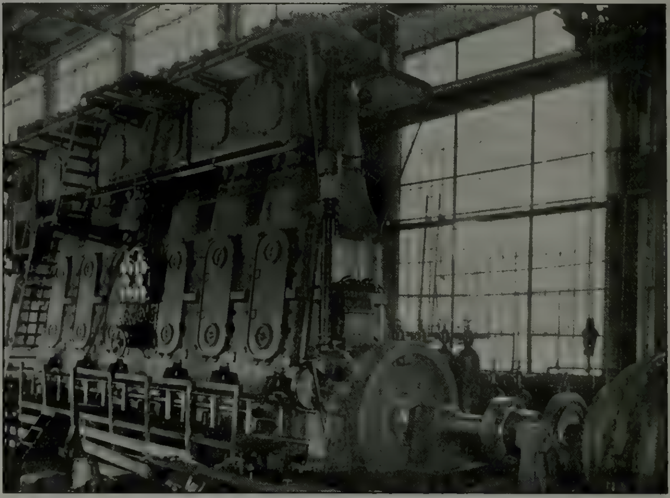
King-Knight Company, who are supplying the Nelseco engines, are also responsible for auxiliary machinery. In this connection it will be noted that there is ample power in any three of the main generating sets to operate the vessel at practical operating speeds. The exciters on the main engines are of sufficient power to take care of all normal excitation loads and, in addition, the lighting and auxiliary machinery loads. In conformity with the rules of the United States Steamboat Inspection Service, an independent auxiliary generating set is being supplied, consisting of a Sterling 4-cylinder, 4-cycle gasoline engine, direct-connected to a 125-volt General-Electric generator delivering 60 kilowatts at 1200 revolutions per minute.

For initial starting air a Gardner-Rix auxiliary air compressor is to be installed of the 2-stage, water cooled type, delivering 21 cubic feet per minute at 500 revolutions per minute, driven through gear reduction by a 7½-horsepower General-Electric motor, running 750 revolutions per minute.

The emergency fire pump is to be a Northern rotary with a capacity of 500 gallons per minute against 125-pound head and driven by a 50-horsepower, 125-volt, 570 revolutions per minute, General-Electric, compound, marine type motor. There will be installed for regular service a Northern rotary fire and bilge pump of the same capacity and driven by the same type motor as above.

(Continued on Page 451)

Successful Tests Made by 3000-Horsepower Busch-Sulzer Diesels



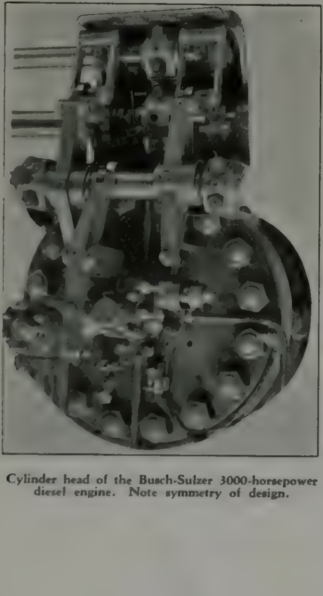
One of the four 3000-horsepower, 6-cylinder, marine type, Busch-Sulzer diesel engines for the United States Shipping Board on the test stand at St. Louis.

FINAL work of erection of the last two of the four 3000-shaft horsepower marine diesel engines on order for the Shipping Board is well along at the plant of the Busch-Sulzer Bros.-Diesel Engine Co. at St. Louis, the second engine having completed highly successful shop trials early in August.

The striking feature of these Busch-Sulzer large marine engines is a marked simplicity of design, not only in the main structural features but in the operating gear. In approaching the engine one is impressed with the absence of moving parts; and while this is especially true at the engine room floor level, on the operating platform it is even more apparent, with but one fuel valve in operation per cylinder.

Of course, the Busch-Sulzer engine follows the well-known Sulzer design in all important features, but credit must be given to the Busch-Sulzer Bros. - Diesel Engine Co. for Americanizing the European diesel to comform to United States manufacturing and operating standards.

Standing directly in front of the engine carrying 3000 horsepower at 90 revolutions, it is quite possible to carry on a conversation in a low tone, and twenty feet away from the engine one would hardly notice that it was in operation.



Cylinder head of the Busch-Sulzer 3000-horsepower diesel engine. Note symmetry of design.

It is only reasonable to expect excellence of design and performance in this most recent Busch-Sulzer product following experience in building 2-cycle engines of both heavy and light weight special types since 1915, over seventy of the latter having been supplied to the United States Navy for submarine service in sizes up to 2500 horsepower per unit. Very little that was new was therefore encountered in designing this slow speed, heavy duty, marine engine, which follows earlier designs with increase in cylinder diameter and stroke.

It is apparent from the results of the 30-day test of the first engine, ending April 17, 1926, that at the rating of 3000 brake horsepower at 90 revolutions per minute, an extremely liberal engine has been furnished to the Shipping Board.

Summary of Results of 30-Day Test First Engine.

March 18 to April 17, 1926.

Average brake horsepower	3012.07
Average revolutions per minute	89.25
Average mean indicated pressure, lbs. sq. in.	81.53
Average mechanical efficiency, per cent	74.47
Total fuel consumed, tons (2240 lbs.) per 24 hours	13.33
Fuel consumption per I. H. P. hour, pounds	.3074
Fuel consumption per B. H.P. hour, pounds	.413
Average lubricating oil, all purposes, gallons per 24 hours	21.5

These results were obtained upon the company's test bed by the use of a Heenan & Froude hydraulic dynometer of 9000 brake horsepower capacity purchased especially for the testing of these Shipping Board engines and calibrated by Geo. H. Walker, chief engineer, Heenan & Froude, Worcester, England, in the presence of representatives of the United States Shipping Board before starting the test at St. Louis.

The average mean indicated pressure of 81.53 pounds is below that specified by the Shipping Board (85 pounds) and the engine has been designed for safe operation at 105 revolutions per minute, at which speed it would develop 4000 brake horsepower at mean indicated pressures and piston speeds well within conservative limits.

The low fuel consumption obtained is therefore all the more remarkable. The average fuel consumption during the first fifteen days of the 30-day run was .4096 pound per B. H. P. hour and on the fifteenth day averaged .4067 pound per B. H. P. hour for the twenty-four hours, Mid-Continent fuel oil of good grade of about 29° Baume being used.

Average Characteristics of Fuel Oil Used During 30-Day Test.

	Baume at 60° F.	High Heat Value	Low Heat Value	Flashpoint	Sulph.	Viscosity Saybolt-Furol at 70° F.
First Half	27.9°	19,415 B.T.U.lb.	18,225 B.T.U.lb.	236° F.	.61%	27 secs.
Second Half	25.1°	19,178 B.T.U.lb.	18.063 B.T.U. lb.	262° F.	.73%	75 secs.

A day's run under test shows the following particulars of the performance of the engine

Performance Data from Test Second Engine, August 10, 1926.

Revolutions per minute	87.18
Brake horsepower	3006.53
Fuel per hour, pounds	1272.4
Temperature—	
Engine room	85.2°
Low pressure outlet	237.1°
After cooler	87.7°
Intermediate pressure outlet	370.4°
After cooler	89.7°
High pressure outlet	373.8°
After cooler	85°
Cooling water inlet	82.8°
Jacket and piston inlet	85.4°
Discharge from jackets—	
No. 1	111.9°
No. 2	111.9°
No. 3	111.9°
No. 4	111.1°
No. 5	112.1°
No. 6	110.5°
Discharge from Piston—	
No. 1	128.3°
No. 2	128.5°
No. 3	128.9°
No. 4	126.1°
No. 5	132.4°
No. 6	129.0°
Exhaust—	
No. 1	392.5°
No. 2	425.0°
No. 3	466.2°
No. 4	416.3°
No. 5	474.6°
No. 6	395.8°
Lubricating oil from engine	114.7°
Pressures—	
Injection air, lbs. sq. in.	850
Scavenging air, lbs. sq. in.	1.75
Low pressure stage, lbs. sq. in	19.9
Intermediate pressure stage, lbs. sq. in.	163.8
High pressure stage, lbs. sq. in.	850
Lubricating oil to engine, lbs. sq. in.	10
Lubricating oil to header, lbs. sq. in.	10
Water jacket, lbs. sq. in.	10.3
Water to pistons, lbs. sq. in.	27.6

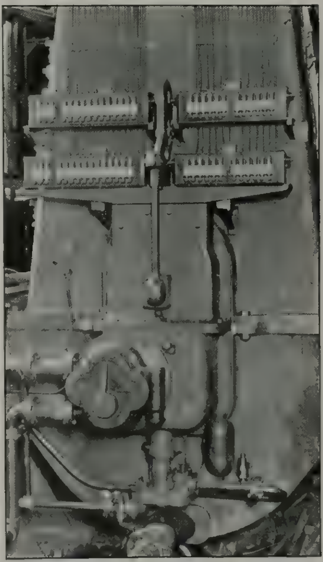
General Description.

The engine is of the 2-cycle, vertical, long stroke, slow speed, heavy duty, crosshead, direct reversible type, having six working cylinders, 30-inch bore by 52-inch stroke, using full compression and air injection system of fuel atomization. It is of the fully enclosed crank case type, fitted with forced feed lubrication and designed for single screw installation with a right hand propeller.

Under normal rating of 3000 brake horsepower at 90 revolutions per minute the piston speed is 780 feet per minute. The engine may be run continuously at any speed between 35 and 95 revolutions per minute, no harmful criticals falling within this range.

The engine is self-contained with attached fuel measuring pumps, injection air compressor, and scavenging pump.

The scavenging pump is of the tandem double-acting type driven from the main crank shaft at engine speed. The scavenging valves are of the reed type, the same valves being used on both scavenging pump and working cylinder ports, the latter being automatic in operation.



Forward end of Busch-Sulzer 3000-horsepower diesel engine showing cylinder lubricators.

The cam shafts for fuel injection, starting, and reversing valves are driven from the main crank shaft through gears and vertical shaft. These gears are lubricated from the force feed system. A double set of fuel and starting cams are provided for ahead and astern running.

Each valve lever is fitted with a short link carrying two rollers, and this link communicates the motion of the cams to the valve lever. The entire reversing process consists merely in adjusting the position of these short links in such a way that one of the rollers rests on the cam for ahead running or the other roller on the cam for astern running as required. The action is very simple and very little effort is needed for its operation.

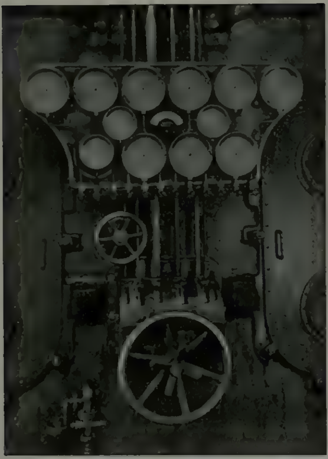
In addition to functioning to reverse the engine, the motion of these short links is also used to vary the lift of the fuel valve and the duration of its opening. This permits the gear to be so arranged that the fuel valve opens exactly at the moment most suitable for the particular conditions under which the engine is operating.

The starting air valves are similarly equipped, operating in conjunction with the fuel valves by the air operated engine known as the Servo Motor which is controlled from the operator's station.

During maneuvering tests, reversing was easily accomplished in seven seconds. The engine was successfully started with air pressure as low as 150 pounds.

The engine is fitted with an oversize air compressor to provide excess air when maneuvering. It is mounted in line with working cylinders, forward of the scavenging pump, has three stages and is driven directly from the engine crank shaft. The effectiveness of the coolers is disclosed by the temperatures recorded in the performance data.

Unlike many Sulzer engines, with maneuvering gear located at the elevation of the operating platform, the Busch-Sulzer gear is placed at a convenient level for operation from the engine room floor level. It is normally actuated by an air motor although capable of manual operation. The mechanism is provided with a patented in-


Control stand and instrument board of the Busch-Sulzer 3000-shaft horsepower diesel engine

terlocking device to automatically prevent the reversing gear being moved while either the fuel valves or starting valves are being operated; and to prevent these valves being made operative before the reversing of the gear has been completed. A patented automatic control is provided for the operating gear; i. e., the operating engineer puts the reversing wheel into ahead or astern position as may be required, thus starting the engine; when all six cylinders are operating on fuel, the actuating air motor automatically shuts down and the maneuvering gear remains in running position.

The fuel pump is located at the after end of the engine, readily accessible from the engine room floor level. It is fitted with one plunger for each of the six fuel valves. The amount of oil injected is controlled by the period during which the suction valves are held open, which is regulated directly from the operating station subject to complete suspension under the action of the overspeed governor. This governor is so arranged that it will prevent racing in bad weather and cut off the fuel when the engine speed exceeds approximately 10 per cent above normal.

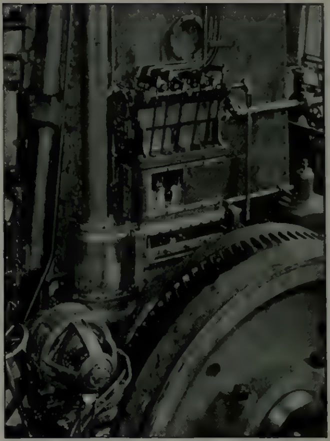
The working and compressor cylinders are supplied with lubrication from force feed lubricators accessibly located at the forward end of the engine near the engine room floor level, and gear driven from the crank shaft.

The simple turning gear is operated by an electric motor and provided with an interlocking device to prevent admission of starting air to the working clyinders while turning gear is in mesh with the rack on the fly wheel.

Above the control station is mounted a gauge board carrying in addition to the usual gauges, a Sperry gyro-type electric revolution counter and tachometer.

Just prior to the placing of orders by the Shipping Board for these four 3000-horsepower engines, the Busch-Sulzer Bros.-Diesel Engine Co. received an order for two 1500-horsepower 4-cylinder engines for installation in the Standard Oil Company's tanker E. T. Bedford. These 4-cylinder engines have the same cylinder bore as the larger Shipping Board engines but a shorter stroke of 42 inches, being designed to operate at a somewhat higher rotative speed.

These two 4-cylinder engines were brought through just ahead of the four 6-cylinder engines, making a total of six large marine engines built by the Busch-Sulzer Bros.-Diesel Engine Co. since the Shipping Board dieselization program was begun approximately a year and a half ago. The confidence of this manufacturer in the future demand for these large engines is shown by the unusually complete set of tools and jigs, to which they have been built in order to insure the accurate fit of replacement parts.


After end of Busch-Sulzer 3000-horsepower diesel engine showing drive for cam shaft, fuel measuring pumps, and turning gear.

While there is less of the spectacular in the successful building of these large single-acting, slow speed marine engines as compared with the new double-acting types, there is something compelling in the extreme simplicity of this fundamental and well-established type which will undoubtedly be in demand for many years to come.

A New Department

Walter H. Ramage
(Photo by Bushnell, S.F.)

BEGINNING with the November issue, Pacific Marine Review will publish regularly a new department under the heading "Who's Who Afloat and Ashore." This department will be under the personal direction of Walter H. Ramage, the well known and popular former assistant general passenger agent of the Oceanic Steamship Company.

"Who's Who Afloat and Ashore" will feature the activities of and personal contacts with the vessel operators of the Pacific Coast. This new department is being started in response to many demands from shipping executives and is simply an extension of Pacific Marine Review service in an endeavor to build up friendly relations among the marine fraternity.

Mr. Ramage will be in close contact on the San Francisco waterfront with the personnel of ships and of shipping companies and will register these contacts in the columns of this department in personal sketches and character studies.

Any suggestions for the conduct of this department or constructive criticisms on the items appearing therein will be appreciated.

Pacific Workboats and Their Power Plants

With the Oregon Boat Builders

RECOGNIZING the value of Portland, Oregon, as a point from which to handle their fast growing diesel engine business the **Atlas-Imperial Engine Company** have offices in the Spalding Building where a corps of efficient representatives are ready at all times to aid customers in solving any problems arising as regards engineering when applied to diesel engines. Personal attention is also given to installations of the Atlas-Imperial engines when requested. In fact, this service is given as a part of the purchase price. The offices are located near the business center of Portland, and anyone interested in diesel propulsion of water craft or power for industrial enterprises will be most cordially welcomed at the Atlas-Imperial office.

William M. Burns is manager of the office and associated with him is A. C. Fries, an engineer and inventor of note. R. W. Strong is another of the staff. This gentleman was for many years with Vickers of England, pioneers in solid injection diesel work in that country. He was also with the Atlas-Imperial organization at its shops in Oakland, California, for many months, and without doubt is one of the most fully informed practical diesel men on the Coast. With a force like this, backed up by a product known so well as the Atlas-Imperial engines, business naturally is brisk. The outlook is also very good for further installations.

Edward G. Tuck, consulting engineer and marine surveyor, Board of Trade Building, Portland, Oregon, is agent for several foreign shipping registry houses. He reports fair progress in marine circles and believes that the next few years will show a great advance.

Speaking of the harbor business of shipping, Mr. Tuck said that there appeared to be a tendency among the operators of larger vessels loading at Portland to have the cargoes brought to the ocean-going vessels by barges instead of themselves shifting from point to point picking up lots here and there. The economy of diesel-operated tugs to handle the barges, together with other advantages such as the lessening of pilot's fees and berthing charges, makes the plan profitable. In addition, a steady lay at one place gives the crew, both engine room and deck, a chance to overhaul and keep in order the vessel, tasks which are difficult if the shifting from point to point is done by the vessel's engines and gear.

Mr. Tuck is the Portland representative of the **Union Gas Engine Company**, of Oakland, California, and says that his firm's products are making a great record on the Columbia River. Many recent installations have been made, and others are in prospect. The Union diesel has given good satisfaction to its users, and repeat orders are common, while new customers are steadily gained.

The **Chas. R. McCormick Lumber & Shipping Company** has quite a large boat yard at St. Helens, about 45 miles down the Columbia River from Portland, where many large wooden hulls have been built. For some time after the slump following the war not much was done there, but lately quite a bit of repair and some new construction work has been turned out. The yard is well and completely fitted for this, and the jobs attended to have been of the best class of workmanship. A big fuel barge for the North west Electric Co. was recently launched. This craft is 130 feet by 34 feet by 6 feet draft and sided up so that she can carry an immense quantity of refuse from the lumber mills, which is used for fuel by industrial plants. Another boat just completed is the Larch for the United States Light House service. She is 63 feet by 16 feet and 5 feet draft, fitted with a 100-horsepower Washington-Estep diesel engine.

The salmon trolling boat S. F. Soini upon the ways of the Wilson Shipbuilding Company at Astoria

Albina Marine Iron Works, Portland, Oregon, have, since the war boom in shipbuilding, kept fairly busy on repair work and barge construction. This firm recently built three steel fuel barges for the Crown-Willamette Paper Company to handle fuel and pulp stock. They are 134 feet by 36 feet by 8 feet 3 inches depth. High siding of heavy planking gives these craft a big carrying capacity.

Two other barges of similar type have also been delivered to the United States Engineers of the 2nd Portland District for carrying dredge fuel.

In addition to general ship and engine repair work, the Albina yard has lately built twenty Rogers bulb sterilizers. These are used by the State Department of Agriculture to clean all imported bulbs. They are tanks of some two tons capacity, with agitators and special disinfectant holders operated by electric motor.

The steamer Newport, motorship Bullarden, and the British steamer Petersen were extensively overhauled and refitted at the Albina Marine Iron Works since the first of the year. Business is reported good with bright future prospects. William Cornfoot is president of the company, and George Rogers is secretary and treasurer. Both these gentlemen are practical shipbuilders and engineers and give personal attention to jobs in hand.

ASTORIA.

Astoria, though one of the oldest coast cities of the Northwest, had not, until a few years ago, made any great advance in shipbuilding. At times various craft have been built there, and during the war two yards, the McEchern and the Wilson, turned out quite a number of wooden hulls for the Emergency Fleet Corporation. Since the war there has been considerably activity in the construction of smaller craft of the workboat type. The district is notable for special types in finishing boats particularly in the troller class.

Wilson Brothers Shipbuilding Company at Smith's Point, Astoria, is the largest of several firms, having very complete repair and building shops, together with ways for hauling out quite sizeable vessels.

The accompanying photograph of one of the trollers shows the two long spars, triced up to the mast, which are lowered to a few feet above water, with two long 600-foot lines trailing from each. Another line is set from the top of the mast. In some cases there are three from the longer spars, making seven in all, though five is more common. A small winch head, operated from the main engine gives quick hauling power, and big catches of salmon are made this way. Bait is a shiny spoon, brass in cloudy weather, and silver in sunny. It takes some skill to keep the lines from tangling when seven are set, but the men become quite expert. When trolling the engines are throttled down to a three-knot speed.

Besides trollers, Wilsons also built recently the patrol boat F. W. Mulkey for Portland Public Dock Commission, which had an **Atlas-Imperial** diesel of 110 horsepower.

Astoria Shipbuilding Co. at Lewis & Clark's River, Astoria, makes a specialty of small tugs and barges. Joseph Dyer is manager and attends to all the executive business. This yard recently turned out a 42-foot tunnel boat for the United States Engineers, to be used on the upper waters of the Willamette River. She is powered with a 68-horsepower Vanbleerk gas engine. Though with a beam of 11 feet 6 inches over a fourth of her length, she has good lines and makes fine speed.

The yard has ways to handle 100 tons and a well fitted shop for general repairs. Since the first of the year some twelve boats for Alaska and Astoria fishing and three large trollers, specially strong for outside work, have been built. One of these has a **Bolinder** heavy oil engine of 45 horsepower and two others of 50-feet length have 50 horsepower **Atlas-Imperial** diesels. All are giving fine satisfaction..

Columbia Boat Works, Astoria, build small fishing boats, gas powered, making a specialty of these. At times somewhat larger craft are constructed, though the type mentioned is the principal output. Thirty-five of these have been delivered since the first of the year.

In addition to the above principal yards, there are at Astoria several smaller individual shops, run in a sort of family or cooperative way, building little fish boats and dories. Collectively they might build some fifty small boats in a year.

O. A. Maunula, Astoria, Oregon, who is associated with the McLin Hardware Company, is engineering representative of the **Union Gas Engine Company,** of Oakland, California. He reports many recent installations of this company's units in workboats at that port. Speaking of the ability of the Union diesels to hold up under continued operation he mentioned that the workboat Rose, with a 65-horsepower Union diesel, ran for three months during the fishing season without any stops for engine trouble. Not even a fuel nozzle plugged during that time and when, at the end of the ninety days, the engine was opened up to clean fuel valves, all were found perfect except one in which only one of the minute nozzle spray holes was fouled. This is a fine record and shows practically perfect combustion and good design. The cannery tender Man-o-War, with her new 75-horsepower Union diesel, is making a good showing and is very satisfactory to her operators.

United States Fisheries Bureau patrol boat Brant, powered with a 225-horsepower marine type, fully reversible, Union diesel engine.

COOS BAY.

Kruse & Banks Shipbuilding Company at North Bend, Oregon, has for many years been noted for the excellence of its work. During the war many large wooden vessels were launched there, and all did good service. In the years before the war a fleet of coasters, both steam and sail, were turned out, and after shipping began to get back to normal, the former reputation of the firm resulted in orders for more craft. Among the latest built is the Brant for the United States Fisheries Commission. This vessel is 100 feet by 21 feet by 10 feet 6 inches, and has a 225-horsepower **Union** diesel, which gives her high speed. She is more of a cruiser patrol boat than some of the others of the fleet, being fitted to berth fourteen people.

The Brant has a fuel capacity of 3600 gallons, giving her a large cruising radius. She is equipped with a powerful wireless set, and is heated with steam supplied by an Ideal boiler. Her flexible economical power and modern improvements make this motor vessel a fine addition to the Fisheries service.

The Union Gas Engine Company is very proud of the fact that the splendid record for maintenance set up by the 65-horsepower Union diesel on the fisheries patrol boat Kittiwake induced this repeat order on the Brant.

Kruse and Banks yard have been kept pretty busy with the Brant and a large line of repair work. The officers of the firm are surveyors to the Board of Marine Underwriters of San Francisco for the District of Coos Bay. Mr. Banks attends to the active management of the yard, while Mr. Kruse devotes his time to the survey work.

Besides the work mentioned above, the yard has lately delivered two large barges for Merritt, Chapman & Scott of San Pedro and five for the United States Government for handling rock in jetty construction at Coos Bay bar. This bar, long a serious menace to navigators, is now negotiable at almost any state of tide or weather.

Successful Motor Auto-Ferry.

A PACIFIC MARINE REVIEW representative made the trip from Vancouver, British Columbia, to Nanimo on Vancouver Island, on the McIntosh & Seymour diesel powered ferryboat Motor Princess. He was struck with the remarkably easy running of the engines, as well as the facility of handling them when an intricate bit of docking was necessary. They responded quickly and with no trouble at all; easier, in fact, than many triple expansion steam engines the writer has been shipmates with.

Speaking with the engineer on watch it was learned that the job averaged nearly 200 running miles per day, making four trips between the two ports daily, carrying from forty to ninety automobiles a trip, besides foot passengers. No repairs have so far been necessary and, in fact, nothing beyond valve grinding has been done for many months. The engineers say that the job is far ahead of steam in ease of upkeep.

As the engines of the Motor Princess are open to the view of all passengers, there are usually a number leaning over the low railing around the engine room watching the "wheels go around." There are many observers who know the principle on which the diesel works and who admire the smooth running of the power plant. All enjoy looking at the steady turning of the machines and noting the speed with which the hull is driven through the water.

San Francisco Bay Boatyards

THERE is always something doing around the shipyards of San Francisco Bay, even if times are slack in other lines. While the season for workboat building has no set months, fishing craft as a rule are ordered so as to meet the runs of fish. A visit around the bay yards by a Pacific Marine Review writer shows considerable new work and repairs going on.

At **Anderson & Cristofani's Yard,** Hunter's Point, San Francisco, a 50-foot barge for K. Hovden Co. of Monterey has just been completed. Two other barges of 46 feet length for private parties have also recently been delivered. A 38-foot fishing boat, powered with a Hicks gas engine of 24 horsepower is also a recent delivery. Two 34 feet length workboats, powered with gas engines, ordered through **A. W. Lawson** for Manila, are to go out on a steamer's deck from the yards at an early date. The **Napa Transportation Co's** scow Neptune, formerly powered with a single **Fairbanks-Morse** diesel, is being rebuilt at this yard and will be changed to twin screw type with two 60-horsepower **Fairbanks-Morse** diesel engines. When the work is done the Neptune will be practically a new boat. Besides the new jobs, there is the usual repair work going forward.

The new cruiser Romance, built by **Anderson & Cristofani** for **H. Kirchman, Jr.**, is now flying the San Francisco Yacht Club's flag and giving every satisfaction to her owner. While not a large vessel, being 38 feet in length and 10 feet beam, she is exceedingly comfortable and well fitted. Mahogany and other fine woods were used in her construction, and she has cost a bit over $20,000. The power plant of two 35 horsepower **Herschell-Spillman** gas engines gives her 10 knots speed. As a sea boat she is more than expected, being especially designed to be comfortable.

Many years ago one of the first Corliss gas engines was installed in the workboat Robbie Hunter. It did good work, but grew old and weak. The other day it gave out, one of the connecting rods breaking, and the whole engine was wrecked. As it would not pay to build a new one, an **Atlas-Imperial** gas engine of newest type has been put in. The hull has also been thoroughly overhauled at **Anderson & Cristofani's** yard, and the Robbie is now as good as new. Her owners, the **Bay Shell Company,** San Francisco, are very well pleased with the whole job, especially the motive power.

At **Bruer & Siemer's yard,** Hunter's Point, a force of twenty-five ship carpenters has been busy on general repair work. The workboat Independent, owned by **Healy-Tibbitts Construction Company** is being rebuilt and engine repairs made. The Independent was at one time a famous oyster runner, powered with sails, and noted for her speed. She is now in the more prosaic business of towing construction materials for her owners. The **United States Engineer's** motor cruiser Suisun is also on Bruer and Seimer's ways having her semi-annual overhaul. Several heavy scows and barges are alongside the repair wharf being fixed up for the strenuous work they are to do later. The firm of Bruer & Siemer are now putting in a new ways and wharf extension to enable them to handle better the larger types of vessels. The new ways will have 11 feet of water over the blocks. The wharf will also give another 100 feet of length for storage and repairs.

H. C. Thomsen's yard at Hunter's Point, San Francisco, has been working full time on government barges, in addition to various other jobs on fishing boats. This yard makes a specialty of repairs and does not cater to new jobs.

George W. Kneass Co., San Francisco, have just completed a big coffee lighter, extra strong and built expressly for handling surf freight. A stock cruiser of the 36-foot class is nearing completion. A new 29-foot speed boat, V bottom type, with a **Hall-Scott** 200-horsepower engine, will take the water soon, and a speed of 45 miles per hour, or better, is expected. She is a splendidly built craft, with double mahogany planking, and controls forward and a passenger cockpit aft. The speedboat Challenger, a 50-mile craft with a 450-horsepower **Liberty** engine, is being overhauled at the yard.

The new yacht K'Thanga, built by **John Twigg & Son,** San Francisco, for **H. O. Harrison** is now in commission. Her **Winton** engines give her much better speed than was anticipated, as 19 to 20 miles per hour was the figure she was designed for. However, after a bit of limbering up, she is doing 22 with no trouble. The Twigg yard has just finished a fine tender for her, fitted with a **Universal** 30-horsepower engine. The tender is built of mahogany and other hardwoods with special attention paid to all metal work, the whole job being solid as well as beautiful, a fitting addition to the big yacht.

Frank Stone & Son, Oakland, has just built a twin screw motorboat for Captain Fred Lewis for passenger service out of San Rafael, California. This craft is 50 feet length, 14 feet beam, and 3½ feet draft. She is propelled by two 25-horsepower Standard gas engines. Engines, controls, and pilot house are amidships, with open shelter cabins fore and aft. Accommodations are provided for from 75 to 100 passengers.

In the same yard the new yacht for John Borden of Chicago is under construction. This vessel will be 140 feet in length, 30 feet beam, and 14 feet draft. She is being built most staunchly, as she will be used for hunting trips in Alaska waters. The bow will have a special bronze casting, backed by heavy hardwood timbers, and brought well aft under the forefoot for ice breaking. All parts of the hull above the water line will be sheathed with iron bark to resist ice cutting. She will have schooner rig with two pole masts but with no topmasts. Staterooms and baths for owner and party of six aft will be fitted up most elegantly, and crew's quarters forward for fourteen.

All auxiliaries will be electrically operated. Two **Fairbanks-Morse** full reversible diesels of 120 horsepower each drive twin screws. Fuel for 5000 miles at full speed will be stored in heavy steel tanks.

James Robertson & Son, Alameda, are building a 90-foot workboat for the Harbor Tug & Barge Co. of San Francisco. This vessel will be pow-

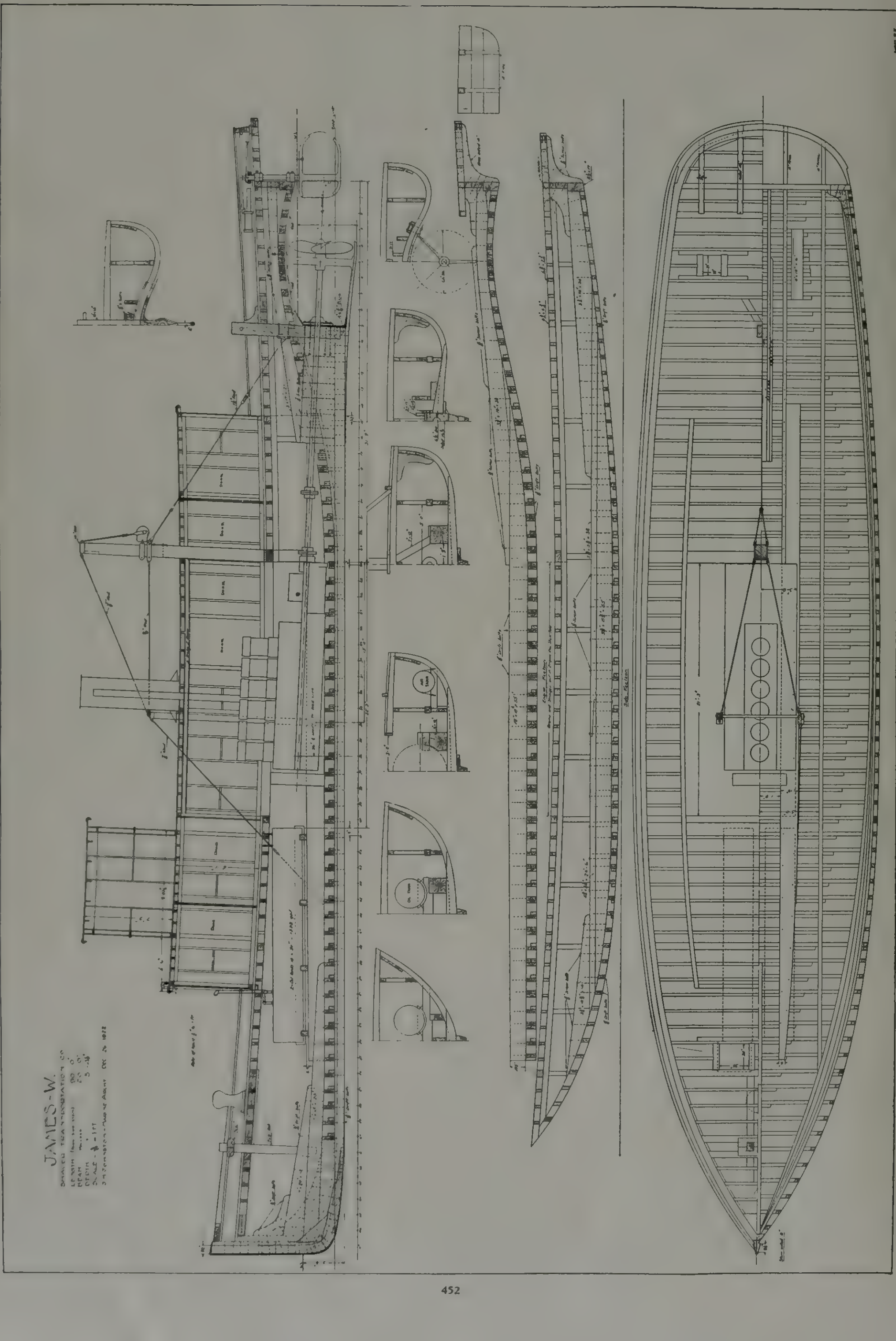
(Continued on Page 453)

New Auto Ferries

(Continued from Page 445)

For the fresh water system, a Byron Jackson pump will be used, 1 inch by 10 inches, delivering 30 gallons per minute against a 75-foot head at 1700 revolutions per minute, driven by a 2-horsepower, 125-volt motor. These fresh water pumps are fitted with bronze trim and with monel metal shafts. A Byron Jackson pump will take care also of the sanitary system. This pump will be entirely of bronze with monel metal shaft and will be 1½-inch bore by 10-inch stroke with a capacity of 125 gallons per minute against a 70-foot head, driven by 7½-horsepower 1750 revolutions per minute General-Electric motor.

Each of the pilot houses will be equipped with a complete Ward-Leonard control system, and a duplicate of this system will be installed in the engine room itself. The galleys, pantries, and dining rooms will be electrically equipped throughout. No fuel will be burned on these boats except inside the cylinders of the engines. The hulls of the boats are of steel throughout and very thorough consideration has been given in the design to all the essential safety factors which enter into the transportation of gasoline driven vehicles.



Shallow draft, tunnel stern, single screw, river tugboat James W., of the Shaver Transportation Company. The James W. was designed by and built under the supervision of J. H. Johnston of Portland, Oregon.

ered with a full reversible **Fairbanks-Morse** diesel engine to develop 300 brake horsepower. This will give her ample reserve to take care of almost any job she will tackle. Heavy and solid construction of the hull is a special feature, though her design is such as to insure good seaworthiness and towing ability.

At the yard of **Crowley Launch & Tug Boat Co.** at Oakland, the towboat Richmond has lately been hauled out for annual repair and painting. Eight big barges for the beet sugar trade have been fitted with new top sides to handle larger cargoes. Crowley Launch & Tugboat Co. is soon to build two speed boats for passenger service on San Francisco Bay. Many calls for such craft have recently been made. Crowley's are putting two in service at an early date to satisfy their demand.

Western-Enterprise Engine Company of San Francisco and Los Angeles, reports sales of engines during the past month as follows: Gas engines, three 30-horsepower, two 40-horsepower, four 50-horsepower, five 60-horsepower, and one 200-horsepower. Diesel engines, two 65-horsepower, two 80-horsepower, one 110-horsepower and two 200-horsepower. Several of these were delivered for stationary work, many locally, others for foreign and marine service.

Union Gas Engine Co., Oakland, California, has sold a 110-horsepower 3-cylinder diesel engine to replace a gas engine in the workboat Fox, owned by the Bay Development Co. of San Francisco. This engine is a duplicate of the one in the workboat Wm. Fisher, same owners, which has been in steady service for nearly two years. Performance was so satisfactory that the new engine was ordered for the Fox.

The Union Gas Engine Co. reports the satisfactory trial trip of the new fishing workboat Atlantic, of San Diego, engined with a 300-horsepower diesel. She makes a good 12 knots, and is the largest vessel of her type yet built for the Mexican Coast fishing business. Her owner, O. Medina of San Diego, is sold on Union diesels, this being the third one he has bought.

J. F. Gisler of the W. H. Worden Co. California representatives of the **Washington Iron Works** reports many inquiries for Washington-Estep diesels. A 150 horsepower engine was sold recently to the Fruit Growers Supply Co. of Hilt, California, for use as power in a drag line plant at their yard. Flexibility and ability to stand up under hard service were requirements to be met. The job stands up well and is giving good satisfaction.

Atlas-Imperial Engine Company reports the following recent installations and orders:

The tugboat Gloria, owned by John Casserto of San Francisco, is having a 125-horsepower 4-cylinder Atlas-Imperial diesel engine installed to replace the old gas engine.

W. Holmes of Sydney, Australia, has ordered a 75-horsepower Atlas-Imperial diesel engine.

Alexander McLeod of Coos Bay, Oregon, has just purchased a 75-horsepower Atlas-Imperial diesel engine, which is being installed at Kruse & Banks yards at North Bend.

The Pioneer Tugboat Company of Aberdeen is another purchaser of a 50-horsepower Atlas-Imperial diesel.

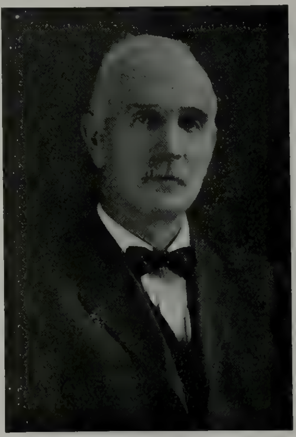
A 50-horsepower Atlas-Imperial diesel engine was shipped recently on the motorship Beulah for the account of Maurice Gillet of Papeete, Tahiti, to be installed in a schooner, 60 feet long by 14 feet beam by 4 feet 6 inches draught.

A 50-horsepower Atlas-Imperial diesel was shipped to Charles D. Warner of Juneau, Alaska on September 16.

A 65-horsepower Atlas-Imperial diesel was shipped to Ferrier & Lucas, September 1.

A 200-horsepower direct-reversible Atlas-Imperial diesel engine was shipped to the Anglo American Steamship Agency, Cristobol, Canal Zone, to be installed in the passenger and freight motorship Cauca.

J. H. Johnston, Naval Architect



J. H. Johnston

J. H. JOHNSTON, naval architect of Portland, Oregon, is probably one of the oldest active men in his profession today. Mr. Johnston, born in Canada seventy-four years ago, of Scotch parents, came to Portland in 1879. Since that time he has designed and supervised the construction of a great number of vessels. Many of these had to meet special conditions, but in all instances the craft were up to or exceeding the predicted performances.

Mr. Johnston is a recognized authority on propellers. He has made an exhaustive and scientific study of propulsion and evolved many special propellers, which in all cases did what they were supposed to do, or better. This is an achievement, for there are many factors influencing the performance of propellers that are not and cannot be concerned by empirical rules. Study of lines of entrance and clearance and other aspects of flow is of vital importance. Also Mr. Johnston has found that in changing a vessel from steam drive to diesel it pays to develop a special propeller. To insure that his plans are exactly carried out, Mr. Johnston makes most of the wheels he designs. A complete plant is maintained for this purpose, and here the subject of this sketch, assisted by his son and other artisans, turns out a propeller just as it is idealized by the designer.

Mr. Johnston has a fine knowledge of alloys. A bronze mixture he recently invented shows remarkable strength and elasticity. Of this mixture he makes propellers for the owner who is alive to the manifold advantages of bronze over ferrous metal for the purpose.

Mr. Johnston designed the tunnel tug James W., driven by an **Atlas-Imperial** engine, 300 horsepower, full diesel unit. The phenomenal success of this workboat made possible the change in the Shaver, a heavy river tug, from stern wheel steam engines to Atlas-Imperial diesels. The lines and layout of the James W. are published herewith, and it is of note that they are the first that Mr. Johnston would give out for reproduction. His high appreciation of this magazine prompted him to break a life time rule, and the tracings herewith will be of great interest to those men who admire such drawings and profit by them. In discussing the plans Mr. Johnston pointed out the rather straight stem. This feature is needed in river work to permit the tug to push heavy barges and log rafts when necessary. Besides being a powerful tug, the James W. can make easily a speed of 14 miles an hour. The big stern wheel tug Shaver was rebuilt at her stern to Mr. Johnston's design, a photograph in the August issue of Pacific Marine Review showing the finely moulded lines of the new stern.

The tug Shaver recently completed very successful trials on the Columbia river making a speed of 11½ miles an hour. Her twin 375 horsepower **Atlas-Imperial** diesels delivered well in excess of their rated power, and the owners were well satisfied in every particular.

Romance of Hardwood

A Few Notes on Hardwood Supplies for Pacific Coast Boat Builders

By R. J. Alexander.

WHEN my friend, the editor of Pacific Marine Review, asked me to write a story on the the above subject, my mind immediately jumped back to boyhood days and visualized again a scene of fifty years ago—a short stocky master shipbuilder in a San Francisco shipyard, watching a shipjoiner shape up with a hand adze a natural oak knee and try to fit it to the camber of the deck beams and the curve of the frames. The master presently stepped across to the yard office and came back with an adze of his own, and in a few deft strokes had the knee perfectly fitted. "How do you do it?" said I. "Well, lad," said he, "to fit oak knees you must have oak in the blood." Pulling up his trouser leg and his woolen undies, he showed me a big blue lump on the inside of his right calf, which, said he, still enclosed a large oak splinter inserted fifty years before when, as a boy, on a winter morning, rough shaping from the square his first spar, he had slipped and straddled the stick the wrong way of the grain.

Now, I knew this old man to be the editor's grandfather. Why, then, ask me, a marine engineer, to tell the story of hardwood—why not write it himself. "No," said he. "We want perspective. Go and talk to White Brothers the hardwood merchants. Get the story of boat and ship hardwoods from the standpoint of the lumber industry."

At the yard of White Brothers, San Francisco's pioneer hardwood dealers, I found hardwoods of many varieties and in great quantities, and found also that the owners and managers of the establishment were full, literally to the lips, with the lure and the lore of hardwood romance. From C. H. White I learned that some hardwoods are very soft and many softwoods are quite hard, the technical distinction being that a hard wood comes from a broad-leaf tree and a soft wood from a needle leaf tree. Thus, much redwood and pine are hard in texture and grain and yet are classed as softwoods, while bass and poplar are very soft and still are decidedly hardwood.

To get trees of the broad leafed variety producing good quality logs, the Pacific Coast hardwood lumber merchant must go far afield and must therefore anticipate market demands and keep in stock large quantities of expensive merchandise. He must be very versatile in his knowledge and tastes. Some hardwood is sold by the pound, some by board measure. Veneers are priced according to the relative beauty of the grain markings and must be selected and sold to suit individual taste. There are thirty-nine different species in the stock list at White Brothers. These are stocked to a considerable extent in blocks and logs. Rare judgment must be used in the cutting of these logs for various purposes.

The hardwoods most frequently used in ship and boat building are ash, ironbark, lignum vitae, oak, and teak. Laurel also is used extensively for dry-dock blocks.

Ash lumber, as used on the Pacific Coast, comes from the Central and Southern States—Indiana and Ohio, Tennessee, Kentucky, Arkansas. It is much used in steamer interiors, particularly in galleys and pantries. Ash is much used also for oars, boat hooks, ladders, refrigerating room doors, and side and stern light boxes.

Ironbark, a species of eucalyptus from Australia, is the hardest, toughest, heaviest, and longest lived of the gums. In ship work on the Pacific Coast it is generally specified for fenders, rudder stocks, and stern ports. Sheathing with ironbark is good practice on vessels designed for hard service in the Arctic.

Lignum vitae is a Central America and West Indian wood. It is of exceedingly close grain and one of the hardest and heaviest woods known to the trade. The perfectly smooth silky polish that it takes, combined with the fact that its natural oil content forms a very good lubricant in conjunction with water, makes this wood ideal for lining stern tubes and other underwater bearings. Lignum vitae is one of the woods sold by the pound. Incidentally it is rather interesting that this heaviest wood and balsa, the lightest wood known, grow naturally in the same locality.

Oak is the great shipbuilding timber. Ships of oak, propelled by wind, girdled the globe in the old days of wooden ships and iron men. White winged ships of oak chartered every sea, they "drew the world together" and "spread the race apart," they brought the first pilgrims across the Atlantic, they brought the Argonauts of Forty-Nine to the Gates of Gold. No modern floating palace of steel, however great her power, speed, or cruising radius, can find a sea whose waters have not already been parted by a keel of oak.

In modern wooden shipbuilding on the Pacific Coast, Douglas fir has taken the place of oak in the framing of ships, but neither it nor any other wood can ever take the place of oak in the long history of shipbuilding or in the hearts of ship lovers.

Oak, fortunately, is one of the most wide-spread and plentiful of the hardwood trees. The red and the white varieties are the ones principally used on the Pacific Coast, and the supply is largely from the Eastern States, with occasional large shipments from Japan. A special brand of oak for boat frames, known as Wybrock Indiana Bending Oak, is in great favor with boat builders.

Teak is an ideal shipbuilding timber, and a few of the finest, speediest, and toughest ships of the old days were built of this wood. Teak grows in Burmah, Siam, and Java. It has become too costly for ship framing, but is still largely used on the Pacific Coast for trim, decking, rails, deck houses, and joiner work by our boat and shipbuilders. The United States Navy uses it for racks in magazines and for armour backing on account of the oil in the wood, which has a very marked tendency to prevent rust or corrosion in adjacent metals.

Hardwoods such as Philippine mahogany, primavera, true mahogany, Jenisero, red cedar, Spanish cedar and many others, are specified for interior trim occasionally on fine yachts and passenger steamers.

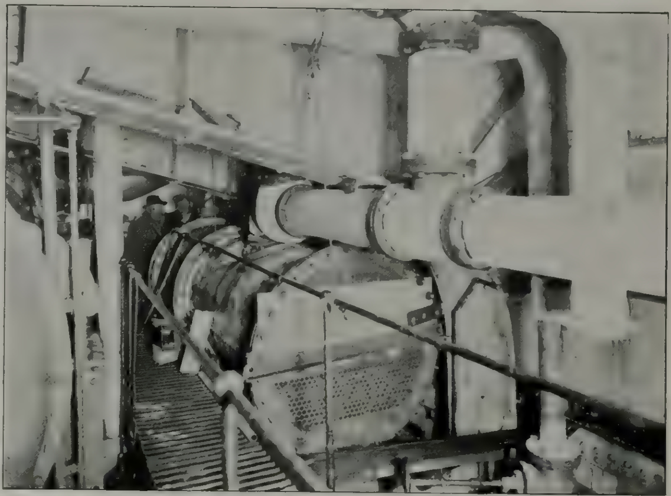
The supplies of these hardwoods come from various out of the way places through correspondents whose integrity and ability have been established by long experience in mutual dealings. To get a certain specification of sizes in a certain grade of a certain species may require individual selection of a certain tree in the forest by a trusted agent. Logs from this tree may have to be carried many miles to stream, rail, or steamer on a slow-moving bullock cart. Months may elapse between the transmission of an order and the possible delivery of the goods. Hence it is imperative that the hardwood lumber merchant anticipate demand by keeping stock on hand. Hence large capital tied up and high overhead on hardwood. The writer well remembers a considerable delay caused in progress of construction on one of Uncle Sam's warships at the old Union Iron Works because a shipment of teak from Siam was held up. Some new breed of mosquito from "The Sludgy, Squdgy creek" had inoculated "the elephants apiling teak," with a new ailment and the pachyderms refused to work, so no teak could be shipped till they recovered.

The yard of White Brothers holds the largest and most varied stock of hardwoods west of Chicago. The firm was established in 1872 and has faithfully served the boat and shipbuilders of the Pacific Coast for fifty-four years. In building pleasure craft and even in workboat design the slight additional expense of hardwood trim will often add greatly to the selling value of the vessel and will aid greatly in economy maintenance.

Enlarging a Condenser in Place

Accomplishing Same Result as a New Condenser with Tremendous Saving

UNDER the direction and supervision of Millard R. Hickman, superintendent engineer of the Matson Navigation Company, the steamship Maliko (ex Cape-May), recently added to the Matson Fleet, was given a general overhauling. Among other items, this work included the installation of twelve new Hyde cargo winches, together with complete renewal of all steam lines and all exhaust piping lines from the deck to the main and the auxiliary condensers. Main steam and exhaust lines on deck were enlarged and renewed with single X piping, high pressure cast iron fittings, and bronze valves. Branch lines to winches, bends around deck houses, and expansion loops were renewed or enlarged with copper. All exposed lines on deck were covered with 85 per cent magnesia insulation and coated with Thorkote.



The auxiliary condenser on the steamer Maliko, showing additional section in place. At the background will be seen foreman James McKay, of the Bethlehem Shipbuilding Corporation. McKay is the second in point of long service record with the Bethlehem organization, having seen 47 years of useful service with this firm.

Matson practice in economic handling of their huge cargoes of sugar, pineapples, and general freight demand efficient fast working of steam winches, and to meet this demand required more cooling surface in the auxiliary condenser than had been provided on the original installation. Due to the fact that the auxiliary condenser was located behind the main engine and main condenser, this problem was not a particularly easy one to solve in that it required the removal in sections of the old condenser and the building of a larger condenser in place aboard the vessel, necessarily involving a very expensive operation.

After considering the problem from various angles, Mr. Hickman determined that the desired result could be accomplished and material saving affected by enlarging the original equipment in place. This was done in the following manner.

A section of cast iron condenser shell approximately one-third the length of the original condenser was prepared and installed on the end of the original shell. The old tubes were removed. A tube supporting plate of brass was installed in the center of the shell. One tube sheet and water box were transferred to the outer end of the new shell. The condenser as lengthened was then retubed with new tubes, and these tubes were packed with Crane metallic packing.

The exhaust inlet was enlarged to accommodate the new larger exhaust line from the auxiliaries. An additional outlet was provided in the bottom center of the new shell section, and this outlet was connected to the old condensate connection when the larger line was run directly to the hot-well with a water seal between auxiliary condenser and hot-well. This arrangement completely eliminates the services of an air pump on the auxiliary condenser, and at the same time provides a vacuum in the auxiliary exhaust line varying from one to four inches, dependant upon the speed of winch and auxiliary operation.

This difficult condenser job has been completed satisfactorily and at a very considerable saving in time and capital investment in comparison with the alternative of installing a new condenser of larger capacity.

Telephones for Malolo

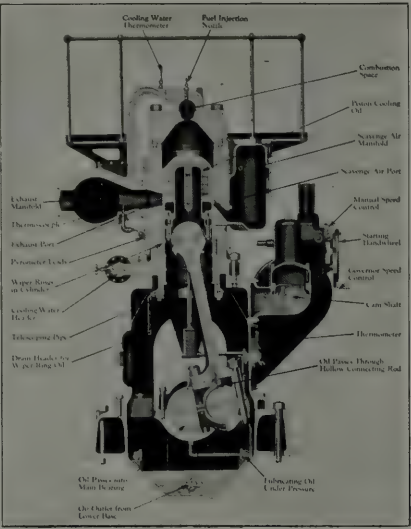
THE Western Electric Company has received a contract for the entire telephone equipment of the steamship Malolo, the largest high-powered and swiftest passenger vessel ever built in the United States. This telephone equipment is the equivalent of a telephone installation for a fair-sized town, for the Malolo will have over 650 first class passengers and the quarters of each passenger will be connected by telephone. In addition to this, there is a complete telephone system for the operation of the ship itself.

The entire telephone system will comprise over 500 telephones with a 340-line switchboard. Each of the passengers' staterooms will be provided with two hand telephones, and all of the crews' staterooms are also to have telephones.

There will be trunks for connecting with the shore telephone while the vessel is in dock, either at San Francisco or Honolulu. Approximately four miles of bridle wire will be used and nearly a mile of lead covered cable.

This is one of the most complete telephone equipments of its kind that has ever been placed in such a vessel by the Western Electric Company.

Larger Fairbanks-Morse Diesels



Cross section through cylinder of 700 horsepower Fairbanks-Morse diesel engine.

THE recent announcement by Fairbanks-Morse & Company of a larger line of diesel engines in ratings of 480, 600, and 720 horsepower, has arroused more than ordinary interest among the users of diesel engines.

These larger diesels are the 2-cycle, single acting, port scavenging, airless injection type. With these fundamental principles a number of very interesting features have been incorporated such as two-stage combustion, pressure lubricating system throughout, reversible and centralized control, and a built-in scavenging pump.

The larger diesel is extremely compact and yet accessible; it is built to stand the hardest service with a minimum of operating attention; and it shows excellent fuel economy. It starts and runs so smoothly that it is difficult to tell whether it is running or not. In short it has the results of all the years of Fairbanks-Morse engine building experience built into it.

Combustion System.

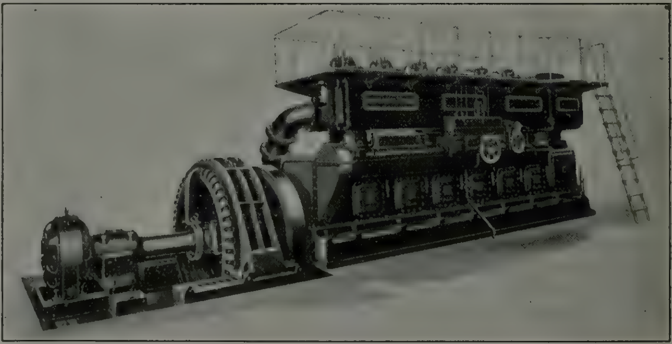
The fuel is sprayed into a combustion chamber located at the top of the cylinder. Timing of injection is such that the flow of air from the cylinder up through the neck of the combustion chamber space meets the injected fuel, causing a considerable turbulence and an intimate mixture of the fuel and air. The injection velocity of the fuel and the entering velocity of the air are practically the same, so that the fuel is not blown back against the surface of the combustion chamber before combustion begins.

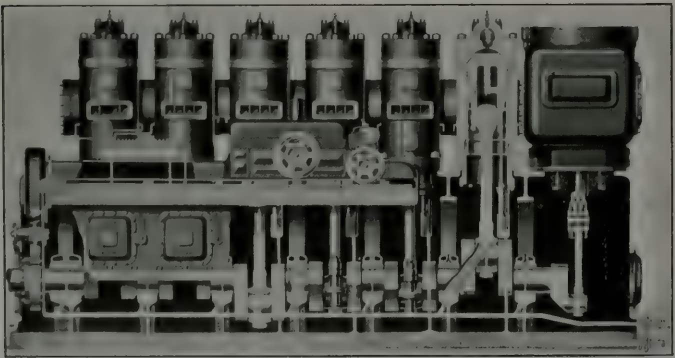
This intimate mingling of air and fuel takes place just at the instant of the maximum compression of 500 pounds, and as the temperature at this compression is approximately 1000 degrees Fahrenheit, the fuel charge ignites and slow combustion begins. Due to the fact that there is not sufficient oxygen in this combustion chamber for complete combustion the fuel charge burns to carbon monoxide.

As the piston recedes on the downward stroke with the attendant rush of gases through the neck into the cylinder space, a further turbulence is created, and a thorough mixing of the excess air with the carbon monoxide gas and remaining oil vapor is brought about and the final combustion of the charge to carbon dioxide gas is completed. So thoroughly has the system been worked out that flat top indicator cards of the regular diesel type are produced and the engine operates with the spontaneous ignition of fuel and complete burning unaccompanied by pressure rise, according to the method first conceived by Dr. Diesel.

Control.

Complete control of the engine is centered in a compact and accessible unit located at the center of the engine and housing the injection pumps and air starting mechanism. A governor unit is mounted alongside the injection and air starting unit thus centralizing the complete control system.





Upper illustration shows side elevation of 700 horsepower Fairbanks-Morse diesel generating set. Lower illustration shows a longitudinal sectional elevation showing force lubrication of bearings and of crank and piston pin.

The larger hand wheel is used in starting the engine. When this hand wheel is thrown to the start position, compressed air at about 250 pounds pressure is admitted to the cylinders in proper order so that the engine begins to turn over. The hand wheel is then thrown to the run position and firing commences. The whole operation takes only a few seconds.

Speed control is taken care of by a smaller hand wheel located on the governor which changes the setting of the governor spring. An indicating pointer just above the rim of this hand wheel shows whether the change in speed is slower or faster. This speed control is used when paralleling two or more diesel-electric generating sets or it may be used for drives requiring speed variation. Since it is necessary to rotate this hand wheel through several revolutions to obtain any considerable variation in the speed of the engine, another small controller is placed on the governor which permits rapid variations in speed. This is useful particularly in connection with marine applications of the engine and in certain applications in the stationary plant field.

Pressure Lubricating System.

One of the outstanding features of the new design is in the way the pressure lubricating system and the arrangements for piston cooling have been worked out. This has been handled in a very simple way and yet all of the main bearings, piston pins, and gears are lubricated under pressure.

A rotary oil pump drains the oil from the main storage tank and forces it through a duplex strainer and then through a cooler into a header in the lower base of the engine. Oil enters this header under pressure and is distributed by branch lines to all main bearings as indicated. Circulation grooves in the main bearings register with holes in the crank shaft permitting the major part of the oil to pass through the crank shaft to the crank pin bearings. In the same manner circulation grooves in the crank pin bearings register with the holes in the crank pin allowing the oil to flow continuously from pin to groove. These grooves in turn connect with holes in the upper half of the crank pin bearing and hollow connecting rod. A hole through the piston pin bearing permits the oil to enter the hollow piston pin.

A tube from the piston pin connects with the oil cooling space in the piston head, allowing a continuous entrance of cooling oil. A telescopic pipe from the cooled space connects with an oil outlet pocket situated in the upper part of the upper base affording a continuous outlet or discharge for the cooling oil. From this outlet pocket the oil is passed through a thermometer well on the outside of the upper base, affording the operator an opportunity to check the flow of oil through the system. After passing through the thermometer well the oil is discharged into the lower base where it mixes with the oil from the bearings and then flows into the main storage tank, after which the cycle is repeated.

Each of the cylinders is lubricated at three points by a forced feed lubricator. The unique feature of the cylinder lubrication is the fact that four wiper rings are set in the cylinder. These wiper rings are so constructed that the upper and lower edge of each ring makes a wiping contact with the piston. The oil wiped off is drained from a small pocket in the ring itself through holes at twelve points around the circumference into a space behind the sleeve from which a small pipe header takes this oil to a sump and from the sump it passes through the purificiation system.

An Unusual Marine Operation

THE cities of Oakland and Alameda, California, separated by the channel to Oakland's inner harbor, are now building reinforced concrete submarine tube for street car and vehicular traffic.

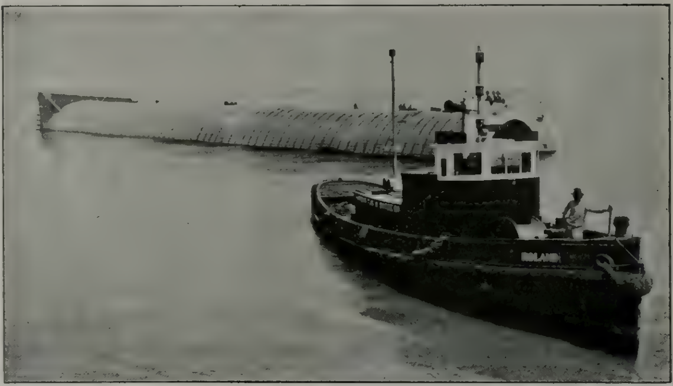
This tube is being precast in eleven sections, each of which is 216 feet long and 37 feet outside diameter, weighing approximately 4500 tons. These sections are being cast in the Hunter's Point drydock by the California Bridge and Tunnel Company and on completion are being towed across the bay and sunk in place in a trench prepared for them on the bottom of the estuary.

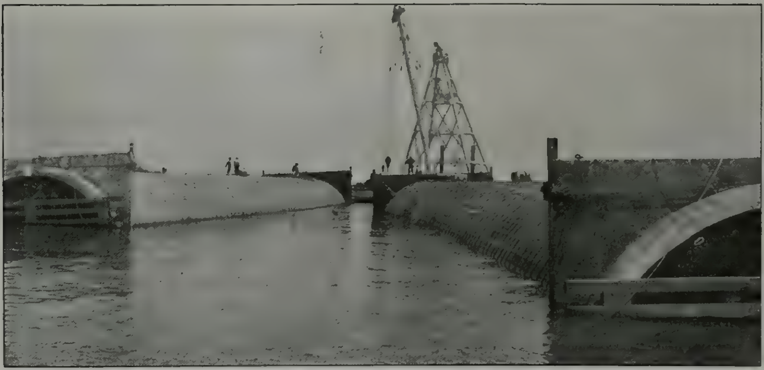
The work of handling these big sections out of the drydock and convoying them to the selected anchorage is being done by The Haviside Company of San Francisco, and it was difficult to perform the operation without such a vessel so equipped as Haviside Barge No. 4. Three sections have been finished, towed across the bay, and successfully lowered in place.

Work is proceeding rapidly on the other sections and as fast as they are finished they will be expertly convoyed to location by The Haviside Company.

The California Bridge and Tunnel Company expect to complete their contract with a large margin inside the specified time.

This vehicular tube is the largest reinforced submarine tube ever built and the only tube of its type ever precast and sunk in place.





Upper view shows one section ready to be picked up by tugs off Hunter's Point. Atlas-Imperial engined tug Roland of the Harbor Tug and Barge Company in the foreground. Lower view shows Haviside derrick barge No. 4 with two sections of tube which the barge has just hauled out of the dock.

Auxiliaries—Ship Supplies—Marine Equipment

An Improved Electric Flow Meter

By Thomas R. Harrison
Director of Research, Brown Instrument Company.

WITH the great advancement which has taken place in engineering practice, realization of the importance of making systematic and accurate measurements of the conditions and quantities involved has grown rapidly. At the same time, the desirability of locating the meters at points of greatest convenience to the users is more keenly appreciated today than ever before.

An example of this trend is supplied by the popularity of flow meters of the electrically operated type by the use of which an indicator may be located in clear view of the boiler fireman as a guide in firing, with the recorder and integrator placed at a convenient point among a group of recording instruments.

Also, from another point of view, electrical operation is especially advantageous for flow meters, since it affords a means of producing external indications and records of conditions existing inside of a high pressure steam or water pipe, without transmission of mechanical motion. Naturally, however, when electrical means are introduced to avoid the objectionable features of a mechanically-operated instrument, other undesirable features are likely to be introduced unless careful planning is applied to all phases of the question.

Because of these considerations, the new Brown electrically operated flow meter deserves the special attention of all engineers interested in flow measurement, since by a novel, but thoroughly practical utilization of a well-known electrical principle, the deseign of the Brown Electric Flow Meter at one stroke avoids all electrical as well as mechanical difficulties previously encountered in flow meters. The manner in which this principle is applied and the mechanism through which the resultant effect is transmitted to the indicating, recording and counting devices may be easily followed by reference to the illustrations.

Principle of Operation.

As shown in Fig. 1, manometer A operates in response to differential pressure caused by flow of the fluid through an orifice B. When the rate of flow increases, mercury is depressed in chamber A_1 and rises in chamber A_2, the difference in mercury level in the two chambers being a measure of the rate of fluid flow through the orifice in accordance with well-known principles. When the flow increases from zero to a maximum value, a float which rides on the mercury surface in chamber A_1 is lowered from the position indicated by dotted lines to a lower position as indicated by the solid lines. The float is made of non-corrosive metal and chamber A_1 has a molded bakelite lining, ribbed on the inside, insuring freedom of action at all times. An armature C of transformer iron is supported by the float on a non-magnetic rod D and the armature is raised and lowered in accordance with the motion of the float.

This armature travels inside of a rust-proof, non-magnetic tube which has high electrical resistance and great mechanical strength. The pressure of the fluid being metered is confined within this tube and the electrical inductive winding EE_1 which is slipped over the outside of the tube has excellent magnetic linkage with the armature which moves inside. At the same time, the coil is under atmospheric conditions only and is protected by a cover F.

The outer ends of the divided winding EE_1 are connected directly across the service mains of an alternating current supply line and connections are run from these ends directly to the outer ends of a similar divided inductance coil FF_1 which operates an indicator H and also to divided inductance coil GG_1 operating a recording instrument I. Armatures are hung on counterbalanced arms J and K in the two instruments. The points of connection between the two parts of the divided coils EE_1, FF_1, and GG_1 are all connected together by a neutral wire P and when thus connected the coils form the self adjusting inductance bridge which is the outstanding basic feature of this flow meter.

When the armature in the manometer is raised or lowered by a change in fluid flow, the relation between the voltages across the two parts E and E_1 of the winding will be changed. This causes the currents in the two parts FF_1 of the indicator coil, and also the currents in the two parts GG_1 of the recorder coil, to become unequal, as a result the armatures of the indicator and recorder move to new positions corresponding to the position of the armature C and the meter readings are adjusted accordingly by means of the gearing or linkage shown.

(Continued on Page 30, Advertising Sec.)

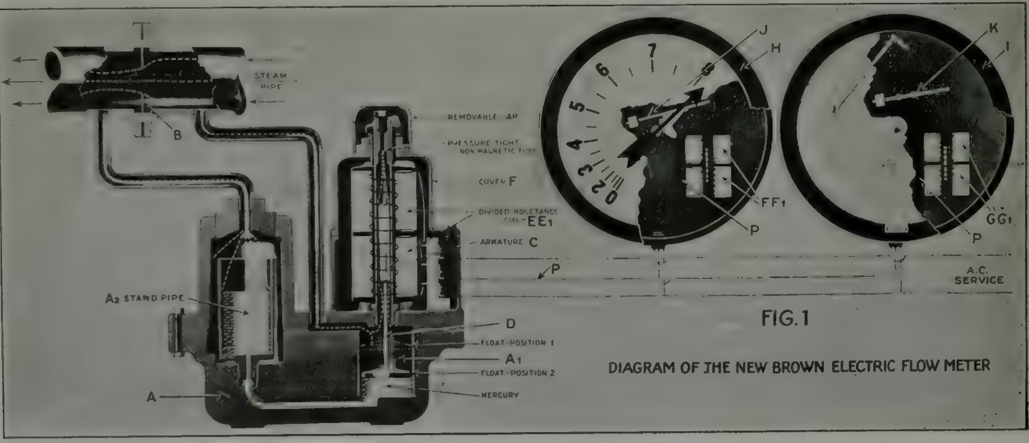
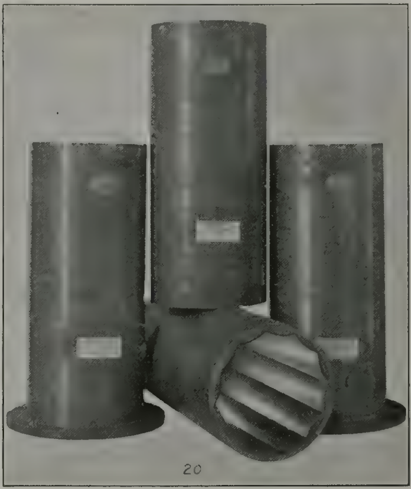


FIG. 1

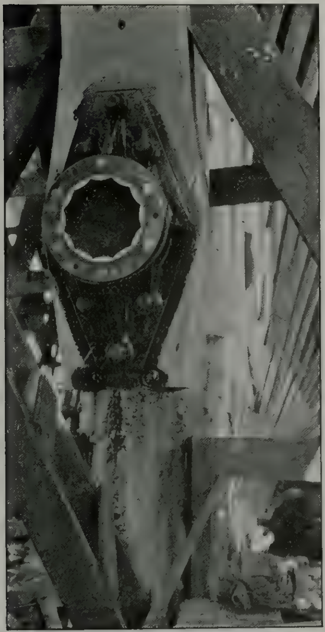
DIAGRAM OF THE NEW BROWN ELECTRIC FLOW METER

Fluted Type Cutless Stern Bearings

THE illustrations accompanying this article give a very good idea of the general appearance and of the method of installing the new fluted type Goodrich Cutless bearings with which the diesel-electric ferryboat Golden State of the Golden Gate Ferry Company of San Francisco is equipped. These bearings on the Golden State are four in number, two at each end. The outboard bearing of each pair is made to fit a 9½-inch diameter shaft and the inboard bearing to fit a 9⅝-inch diameter shaft. The rubber bearing in each case is vulcanized in a bronze sleeve and each bearing has twelve interior faces, these faces being shaped on a 4-inch radius form inverted flutes almost corresponding to the strips of lignum vitae in the ordinary wooden bearings used in stern. On account of this construction the bearing is to be known as the Fluted Cutless to distinguish it from the spiral groove cutless bearings which have been in service for some time.



Fluted type Cutless rubber stern bearings for the diesel-electric ferryboat Golden State.



View of stern tube at one end of ferryboat Golden State, under construction, showing method of securing outboard fluted type Cutless bearing to the stern tube.

The bronze sleeve for the bearings on the ferryboat Golden State are 2 inches larger in outside diameter than the inside diameter of the rubber bearing and the metal is 7/16-inch in thickness. The inside diameter of these bronze sleeves is rough threaded, 12 threads to the inch, so as to hold the rubber firmly in place. The sleeve of the outboard bearing has a 15½-inch diameter flange on the outboard end, which, as can be plainly seen in the illustration, is attached to the stern tube by large machine screws. Each of the sleeves of these bearings is 27 inches long over-all. The outboard bearing in each case weighs 171 pounds and the inboard bearing 153 pounds.

These bearings, in common with all of the Cutless rubber stern tube bearings which have been installed, are giving excellent service in daily use and indicate that The B. F. Goodrich Rubber Company, manufacturers of Cutless bearings, have achieved a very high standard of practice in obtaining uniform condition of material and control of vulcanization.

The new fluted type of Cutless bearing was introduced to the marine market only after exhaustive laboratory research and tests. Several installations have been made on commercial vessels, and service reports to date confirm the excellent results obtained in the laboratory.

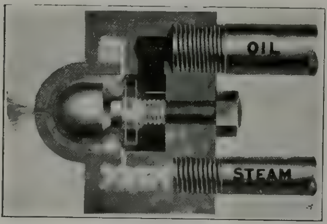
A fine engineering service is maintained by the San Francisco branch of The B. F. Goodrich Rubber Company under the personal direction of Wm. D. Rigdon. Ship operators and marine engineers are urged to use this service in the interest of greater economy and efficiency in stern bearings.

The P. and B. Oil Burner

A NEW oil burner, said to be one of the most efficient on the market, is now being manufactured and sold by F. Beers & Co., Federal Trust Bldg., Newark, New Jersey. Careful tests have demonstrated that it uses only 1.3 per cent of steam.

The burner has only three parts and is adaptable to any kind of flame to suit any type of furnace. It protects itself from overheating by absorbing the heat radiating through the cap into the steam used for atomizing.

It is well known by all oil combustion experts that complete atomization of oil is necessary for efficient burning. The design of this burner is such that it causes the steam to break up the oil into very minute particles. The breaking up is done inside, not outside, of the burner. Four inside steam jets are employed, all acting at right angles with four oil jets. Steam consumption is hereby reduced to a surprisingly low figure.



Section through the P. and B. oil burner showing method of atomization.

In one instance a P & B Burner, with 75 pounds oil pressure and 120 pounds steam, oil temperature 120 degrees Fahrenheit, 14 Baume gravity, four ¼-inch by 3/64-inch steam ports and four ¼-inch by 1/16-inch oil ports, and an 1/8-inch by 3/16-inch burner tip actually developed 1000 boiler horsepower per hour, maximum. The same burner developed a minimum of 25 boiler horsepower per hour, with a steady and perfect small fire.

Machining is so accurate that when the two sections are bolted together by the four cap screws they are perfectly steam and oil tight without the use of any gasket. The central plug is held in position by a single 5/16-inch cap screw and is also oil-tight without the use of a gasket.

The Selection of Piston Rod Packing

THE following information on this subject was abstracted from an article in Power by L. H. Morrison:

When selecting a packing for piston rod stuffing boxes three basic considerations should determine the choice. These are:

1. Steam tightness with a minimum of gland pressure.
2. Elimination of rod wear.
3. Reduction of frictional resistance to the motion of the rod.

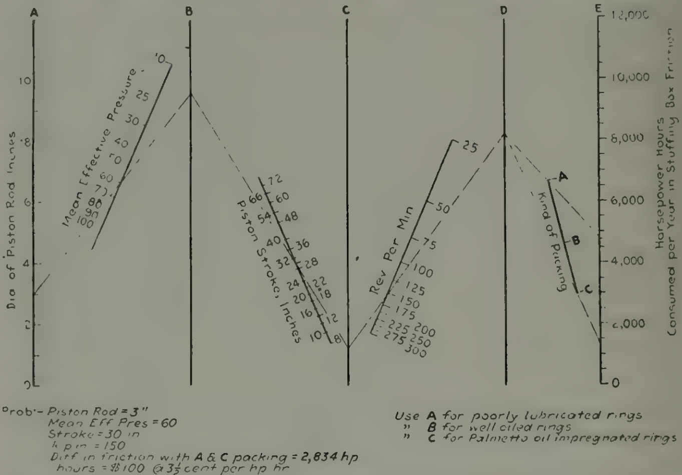
A correctly designed packing possesses sufficient elasticity to seal the rod against the leakage of steam without unduly tightening the gland-bolt nuts. In fact the nuts should be run up by the fingers without the use of a wrench. If the packing is of a more or less unyielding material considerable pressure must be exerted by the gland to force the packing out against the rod. Being under this compression, the packing does not possess sufficient elasticity or "give" to accommodate itself to any slight change in the rod diameter that might be caused either by heat expansion or by prior wear making the rod rough and uneven.

A correct piston rod packing must then be elastic; in other words, it must possess "give."

The constant rubbing of the rod on the hard-pressed packing causes the fibre to wear very rapidly. This of course calls for frequent renewal of the packing, but the greater damage is that done to the rod. The hard layers of the packing rubbing against the rod sets up a scouring action that results in a fluted or rough surface on the rod. The rough rod becomes difficult to seal, calling for more gland pressure and entailing more wear on the rings.

Too little attention has been given to the question of frictional resistance resulting from poor lubrication of the packing rings. Many are under the impression that, since the power consumed in overcoming the resistance at the stuffing box is a small percentage of the power developed by the engine, the problem calls for little consideration. To the contrary the difference between a packing with a copious lubrication and one possessing little amounts to a considerable item in the yearly cost of power.

Assume that the engine cylinder is 24 inches in diameter and with a 48-inch stroke. The speed of the engine is 90 revolutions per minute, and the steam pressure is taken as 150 pounds per square inch; operating non-condensing, a usual mean effective pressure is 70 pounds per square inch. The rod of an engine of these dimencated packing and at C for the Palmetto oil-impregnated packing. The sions as built by a prominent manufacturer, is 4 inches in diameter.



Nomogram for figuring horsepower waste through stuffing box friction with various grades of packing.

With the engine operating all year the total horsepower consumed in overcoming the additional friction caused by poorly lubricated rings as compared with well lubricated rings during that period totals 3504. The cost of power in factory plants is at least 3 cents per horsepower, which makes the cost of the excess power lost in overcoming stuffing box friction amount to $105.12.

This is many times the cost of the "Palmetto" lubricated rings needed to keep the friction at a negligible value.

In order to permit one to calculate the horsepower-hours consumed in overcoming stuffing box friction, the accompanying nomogram has been prepared. The broken lines show the method of use. Starting from the correct piston rod diameter marked on the vertical line A, a straight edge is passed across the inclined line marked "Mean Effective Pressure" at the value corresponding to the mean effective pressure carried on the engine. From the point where the straight edges cut the second vertical line B a second line is used to cut the inclined line marked "Piston Stroke" at the point corresponding to the engine stroke in inches.

From the intersection of this second straight edge with the vertical line marked C a line is drawn cutting the inclined line titled "Revolutions Per Minute" at the correct revolutions per minute point and from the intersection of this line into the vertical line D draw a line to cut the inclined line marked "Packing" at A for dry packing, at B for the usual surface-lubripoints at which the vertical line marked E is cut shows the horsepower-hours lost yearly when using these packing rings.

Book Review

The Hydrographic Office, Its History, Activities, and Organization. 112 pages, bound in blue buckram with gold stampings, being No. 42 of the uniform series of Service Monographs of the United States Government; prepared under the auspices of the Institute for Government Research by Gustavus A. Webber; published by Johns Hopkins Press, Baltimore, Maryland. Price $1.

The Hydrographic Office is a service attached to the Bureau of Navigation of the Navy Department, not to be confused with the Bureau of Navigation in the Department of Commerce. The Hydrographic Office is charged with hydrographic service, the preparation of marine charts, and the publishing and selling of information valuable to naval and mercantile navigators. During the fiscal year of 1925, its annual production of memoranda, pilot charts, notices to aviators and navigators and others amounted to 1,700,000 copies.

The monograph under review is full of valuable and interesting information concerning the present status, administrative work, and history and outlook of this obscure but very valuable department of the United States Government. Every man who uses a chart and every owner and operator of a ship should get this book and read it, so that he may appreciate the amount of service which he is obtaining from his government when he buys, for seventy-five cents, a chart upon whose accuracy he is staking the value of the ship under his charge and the lives of his crew and passengers.

New Deck Auxiliaries

A NEW boat and sail hoist with self-contained electric drive and a new horizontal type windlass designed along similar lines are announced by the American Engineering Company, Philadelphia.

These two machines have been designed especially for use on yachts of 90 feet or less, using not over ½-inch chain and 250-pound anchors. They operate with a snap switch control and are built to give a great range of speeds automatically, taking in slack cable at close to 60 feet a minute and slowing down for heavier loads without any attention from the operator.

Being self-contained, these machines need only to be bolted down on deck and require no space below deck, where king posts, water tanks, and other structures frequently interfere with the installation of windlasses and hoists that have mechanism below deck. All electrical equipment, including the starter and motor, is enclosed within the central casing where it is fully protected but is accessible in a few minutes.

The main parts of the machines have a smooth galvanized finish, with a liberal amount of brass trim. The bollards, heads, and the casings over the wildcats are of bronze.

Modulating Radiator Valve

A MODULATING radiator valve of new and unique design for one or two pipe low pressure steam, vapor, and vacuum systems is announced by Jenkins Bros., valve manufacturers, 80 White Street, New York.

This is a patented valve with the disc and seat in a vertical plane, which is a new feature with several particular advantages. This construction prevents foreign matter, such as scale and core sand which falls from sections of cast iron radiators, from lodging on the seat and hindering tight closing of the valve.

Steam enters at the top of the seat and condensation drains out of the bottom of the seat, which is an important advantage when the valve is used on a one-pipe low pressure system, because the flow of steam into the radiator is not retarded by the returning condensation. This design also eliminates gurgling, water-hammer, and shock. Vacuum is under the disc holder with a tendency to draw the disc to the seat.

A spring holds a Jenkins composition disc against the seat, and seating and tightness do not depend on a threaded spindle. The spindle is provided with a cam on the lower end, the action of which opens or closes the valve. It can be turned only one half revolution, the cam striking flats which cause a positive stop in the open or closed positions corresponding with "on" and "off" on the indicator dial.

Leakage around the spindle is prevented by use of a Jenkins composition ring compressed by a bronze spring, both of which are held securely in position by a bronze cap which screws over the top of the body. Temperature around the spindle is constant and the packing ring is not subjected to expansion and contraction.

The inlet end of the body, the union nut, and the disc holder guide or cap are provided with beads or ribs in place of the customary hexagon. These beads conform very closely to the grip of the pipe wrench and prevent marring or cutting, which is difficult to avoid when installing a valve with hexagons.

The handle is made of red Bakelite which is not affected by heat or temperature changes, and will not crack or chip.

The valve is made of high grade bronze, rough body, nickel plated all over, with polished and nickel indicator cap. It is furnished in ¾-inch size and the center to end dimension conforms to the recommendations of the Heating and Piping Contractors National Association and the Manufacturers Standardization Society.

Forged Cylinder Pumps for Oil Lines

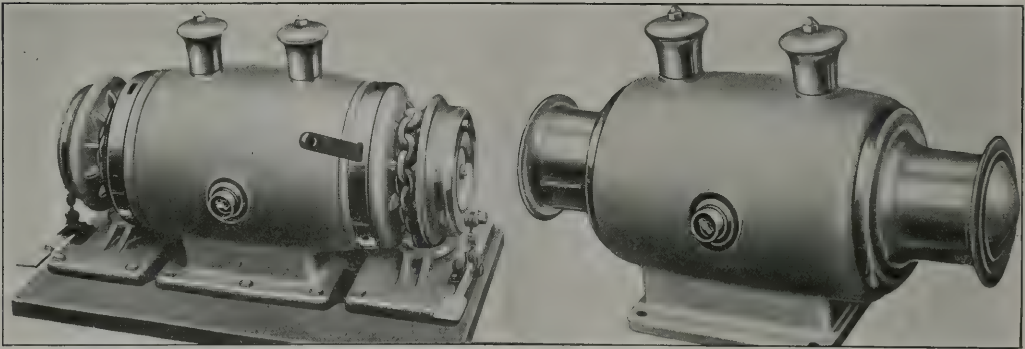
THE Worthington Pump and Machinery Corporation has developed at its Deane Works, Holyoke, Massachusetts, a forged-cylinder pump for feed and auxiliary oil pipe lines. In extending its line of forged cylinder pumps into the smaller capacities and pressures, a self-contained substantial and rigid unit of exceedingly compact design has been made possible.

These forged end pumps are built in capacities up to 40,000 barrels per 24 hours. A 4½ by 12-inch, duplex, double-acting pump, for example, has a capacity of 6000 barrels per 24 hours. It is designed for a maximum pressure of 900 pounds per square inch, or a normal working pressure of 750 pounds per square inch. Its over-all length is only 12 feet 10.5 inches and its overall width only 6 feet 2 inches.

Each cylinder and its passages are tooled out of solid machine-steel forging. The throats are bronze lined with deep stuffing boxes, the flow is straight and all clearance close. The plungers are of high quality steel, accurately machined and ground round and parallel.

The valve chambers are tooled out of the cylinder forging. Steel ball valves of the encaged type operating on hard gear-bronze renewable seats are used. Each valve is separately accessible from above through individual valve chamber covers.

All parts of the power end of the pump are readily accessible. The crank shaft and connecting rods are steel forgings.



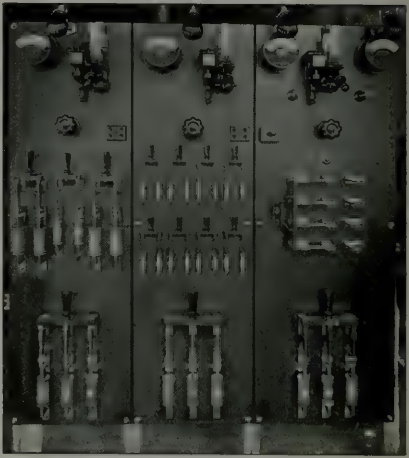
Compact, self-contained, electrical deck auxiliaries built by the American Engineering Company. Windlass at left, sail and boat hoist at right.

Finest River Steamers Cory Equipped

Our illustration shows the main switchboard supplied by Chas. Cory & Son, Inc., of New York, through the San Francisco branch, for the steamers Delta King and Delta Queen, now nearing completion at the Stockton shipyards of the California Transportation Company, for first-class passenger service between San Francisco and Sacramento. These vessels are to be the finest of their type ever built.

A feature of the equipment will be the especially designed fittings, switches, annunciator buttons, and lighting fixtures, which are being carefully matched to the decorative motif of the individual staterooms and public rooms.

Cory loud-speaking telephones and Cory electric engine room telegraph systems insure adequate and safe communication between bridge and engine room.



CHAS. CORY & SON, INC., electrical engineers and contractors, established in New York in 1845, have long since become a nation-wide service in the design and manufacture of marine signalling, indicating, and lighting systems. The work of this firm has always been of a very high standard and they are especially proud of the fact that for many years certain lines of their apparatus and fittings have been accepted for United States Navy standard. It is not surprising, therefore, that at the present time, when two steamboating firms, three thousand miles apart, are building the finest examples of river passenger steamboats ever put into service on American rivers both of these firms should turn to Chas. Cory & Son for the equipment of these boats with interior communication and lighting systems.

The Delta King and Delta Queen, now nearing completion at the Stockton shipyards of the California Transportation Company for high class passenger transportation on the Sacramento River between San Francisco and Sacramento, are equipped with Cory type electrical engine room telegraph systems of the same type used for naval installations and on large ocean liners.

Cory loud speaking type telephones insure connection between the pilot house, after bridge, and engine room.

Cory electric lighting fixtures, adapted for every special use, insure adequate illumination in all under deck spaces.

In the staterooms and public rooms of these vessels the lighting fixtures and the fittings, switches, annunciator buttons, and other electrical equipment are designed especially by Cory experts to match the individual finish of the various rooms.

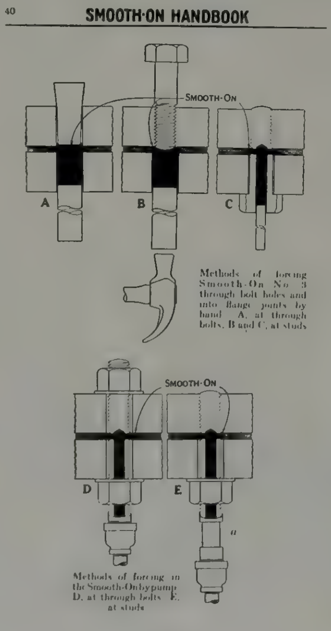
Two main switchboards governing the electrical light and auxiliary power circuits are also furnished by Cory.

Three thousand miles away, at Wilmington, Delaware, the Hudson River Day Line is having built at the yard of The Pusey & Jones Co., a high class passenger vessel for operation on the Hudson River between New York and Albany. The specifications for this vessel called for the very highest type of fittings and appliances and here, as in the case of the Delta King and Delta Queen, Chas. Cory & Son, Inc. are supplying the interior communication systems and the main switchboard controlling the generators, the lighting circuits, and the circuits for the auxiliary electric motors.

In addition there is to be installed the latest type of Cory Aero fire detecting and alarm system to protect all passenger quarters throughout the ship. A Cory mechanical engine and docking telegraph installation will be made in the pilot house and engine room with Cory emergency bell system and Cory whistle operator.

The Hudson River Day Line officials have always made a feature of the engine rooms on their boats, opening them up on the main deck level so as to place the engines and the auxiliary machinery in full view of the passengers. On the new boat this feature will be emphasized and the Cory company contemplates making an electrical installation in the engine room of this ship that will be as nearly ideal as possible not only in producing scientific illumination and following the best engineering practice, but also in being highly ornamental.

A Useful Handbook For Marine Machinists



40 SMOOTH-ON HANDBOOK

Methods of forcing Smooth-On No 3 through bolt holes and into flange joints by hand A, at through bolts, B and C, at studs

Methods of forcing in the Smooth-On by pump D, at through bolts E, at studs

Smooth-On Hand Book, 20th edition, is a very useful manual for mechanics in all branches of industry and for the handy man around the house.

The book describes the various uses of Smooth-On coments and covers a very wide range of emergency and permanent repairs possible. Smooth-On is an iron cement manufactured in powder, putty, paste and liquid form. The Smooth-On Manufacturing Company also produces Smooth-On iron paint, Smooth-On corrugated iron gaskets, and Smooth-On pipe clamps. It has been found useful and successful in practically every mechanical application, from the protecting of screw thread joints to the repairing of tin roofs.

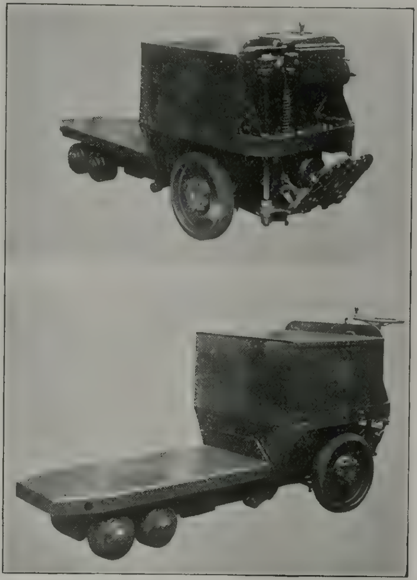
The Smooth-On hand book has 138 pages, profusely illustrated, describing the many practical ways in which Smooth-On can be made to restore the functioning of pipes and pipe joints and various details of machines, engines, and auxiliaries. The book can be had for the asking from the Smooth-On Manufacturing Campany, Jersey City, N. J., or any of their many agencies.

Smooth-On products for the California marine trade are distributed by Johnson Joseph & G. M. Josselyn & Co., 46 Sacramento Street, San Francisco.

New Type Elwell-Parker Tructor

COMPETITION in industries located in populous districts, where high realty values and labor costs predominate, is gradually forcing the attention of industrial executives to the problem of cutting labor costs and space requirements by handling goods through process in large units. In line with this condition the Elwell - Parker Electric Company have developed a new compact design of electric lift tructor to carry five tons. This tructor has a platform 27½ inches by 60 inches with a height of 11 inches off the floor in the low position.

The Elwell-Parker, heavy duty type, fully enclosed motor which actuates this unit is placed in a horizontal position, thus somewhat lowering the battery deck, and the battery compartment is designed to take the large Edison cells up to 300-A-8 or 18 cell -21 plate Ironclad.



The new 5-ton Elwell-Parker electric lift tructor.

The load platform is of heavy steel plate with edges bent downward into a deep flange and welded at the corners. The end is tapered with upper corners rounded to assure easy entrance of skid without damage. The platform is reinforced by heavy angle at the rear where jack ram connects; a channel where taper begins and two intermediate cross reinforcing bars. The front platform link bearing-casting meets the 3-inch cross reinforcing over the trail axle and extra heavy lift links, with renewable hardened-and-ground pressure lubricated bushings, are fitted. The lift unit is heavier and is located between propelling power plant and platform.

Naturally in transporting a heavier load the bulk of the increased capacity is imposed on trail axle; consequently to facilitate the employment of this unit with 11½ inch high skids already in use it has been necessary to add two more wheels with tires and bearings for the distribution of the weight, as tire diameter and tread cannot be increased.

The Elwell-Parker cluster wheel or tandem axle is quite unique in design when consideration is given the fact all four wheels steer simultaneously, all levers are over the axle and none are exposed either below or behind the axle. The wheel steering knuckles are drop forged with alloy steel pins in hardened and ground bushings located approximately over tire center line. The knuckle pins are hardened and ground cupped to carry ⅝-inch ball, on which rests a hardened button to permit turning of wheel under load on a point. Forged knuckle levers carry renewable bushings and fixed hardened and ground pins with drop forged yokes for interconnection steering rods. Their construction is best suited at this point for the wheels and levers oscillate as a unit.

The two wheel axles are really one steel casting with heavier cross pin bearing in special steel casting anchored to tructor center sills. In traveling uneven floors the axle may rock. The design and construction is simple and practical with all operating parts protected against any accident which would render them inoperative. Each of the four wheels is fitted with a 10 by 6 tire and dust proof double roller bearing.

The steering connections from the tandem trail axle to operator's end, as well as those including cross rods on drive axle, are of the ball and socket type so that misalignment is eliminated and easy steering assured.

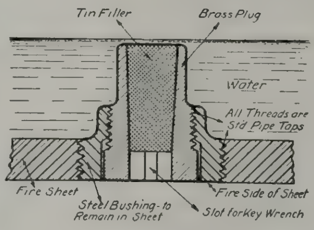
Steering is by means of a 16-inch horizontal hand wheel at the left of the operator. This wheel shaft carries a cut steel bevel gear with companion gear on worm shaft carried on one radial single row and one radial and thrust double row ball bearing. The steel worm engages a bronze worm wheel carried on upper end of steering column.

The lift switch is of the drum type with four fingers interchangeable with those in the main controller and fitted with reversible tips. This switch, located beneath battery on left of truck, is tripped by means of a rod attached to the platform near the ram connection. The adjustment for trip is up beneath battery deck and accessible from side. The switch is manually operated by the indicating lever located on the right. The motion of lever indicates motion of platform.

The new heavy duty type Elwell-Parker controller has reverse drum that remains locked in off position until operator steps on one pedal. All fingers and tips are interchangeable; all tips reversible; main drum and reverse drum return to off position when operator releases or steps off truck pedals; brake is set until operator's weight depresses brake pedal against spring; brake is applied when operator steps off tructor.

Steering and general handling of this unit are surprisingly easy and its placement on the market anticipates the requirements of 1927 production. Iron and steel, foundry and mill raw materials and finished products may now be stored and handled in large units outside of crane covered areas. Short turning radius permits the use of the Elwell-Parker E-10 tructor in narrow aisles in cars or on elevators.

The Ray Fusible Plug



RAY FUSIBLE PLUG
Patented

SOME eight or ten years back in Eureka, California, there was developed an improved form of fusible plug that has many features recommending its use on marine boilers.

This plug, as shown in the illustration, is held in position on the fire sheet of boiler by a steel bushing which is threaded permanently into the fire sheet, is flush on the fire side and projects on the water side. The brass plug is threaded into the steel bushing and held in such wise that no fire ever reaches the exposed threads of bushing or plug. This construction insures the following advantages:

1. No part of the plug projects into firebox.

2. The steel bushing is permanent and the threaded hold in fire sheet is never damaged. This saves hours of labor retapping to insert larger plugs.

3. No threads are exposed to water and the standard pipe thread used in plug to bushing connection makes for easy removal of plug and for standard replacements.

4. These plugs may be removed for inspection and reinserted as often as desired.

5. A key wrench or screw driver is all that is required to remove this plug.

6. The tin is entirely above the fire sheet and practically surrounded by water so that it does not melt away in ordinary use or loosen from plug walls; but always blows when water is dangerously low in the boiler.

After eight years in service not one bushing of the Ray fusible plug has been replaced or damaged and standard size Ray plugs continue to fit the original bushings.

Squires and Jones, 37 Spear Street, San Francisco, are marine distributors for the Ray Fusible Plug Company of Eureka, California, manufacturers of this excellent protective device for marine boilers.

An Unique Boiler Feed Regulator

THE problem of regulating boiler feed without a float, generator, link, or thermostat, has at last been solved in a surprisingly simple way.

It is so simple, that any engineer can install the regulator with guaranteed assurance of positive feed water regulation to any desired water level. This regulator, the Campbell, has no moving parts. It is a simple hollow casting with an inlet, an outlet, and a pressure port.

If the water in the water column is slightly below the lower or open end of the supply pipe, steam will be passing into the regulator through a very small orifice. The orifice is so small that the pressure of the steam drops to about 10 per cent of the boiler pressure. This steam then passes out of the regulator body through a second orifice which is slightly larger than the inlet orifice. These orifices are so proportioned that the pressure in the regulator is maintained at about 10 per cent of the boiler pressure. This reduced pressure, acting on the diaphragm of the feed water control valve, through a connecting pipe is not sufficient to close the control valve, and water continues to be fed into the boiler as long as the water in the boiler is below the open end of the supply pipe.

As soon as the water reaches the inlet of the supply pipe, hot water instead of steam flows into the regulator and immediately some of that water flashes into steam and a pressure within the regulator equal to nearly 60 per cent of the boiler pressure is created. This high pressure, acting on the diaphragm of the control valve, closes the valve tight and water ceases to be fed into the boiler. The rise and fall of pressure within the regulator is as certain as is the law of physics on which it is founded.

By using any well known formula for steam flow through orifices, such as Napier's, and any well known hydraulic formulas for flow of water through orifices, it is a simple matter to check up and prove that more heat passes through an orifice in a given time in the form of hot water at steam temperature than in the form of steam at the same temperature. That, briefly, is the simple and unfailing principle upon which this remarkable device is based.

A simple and reliable regulator, it is small and compact, yet powerful enough to operate the largest high pressure feed water control valves. Its ease of installation has pleased all engineers to whose attention it has been brought. Any engineer or mechanic can attach it to any water column through the top, at the side, through the try cock connections, or it can be tapped into the column or boiler at the desired water level. The control valve will operate in any position, at any height above or below the water level, and at any distance remote from the boiler. The flow of steam or water through the regulator is negligible in quantity, and when it is returned to the boiler through the heater or receiver, the thermal efficiency of the regulator is 100 per cent, as no heat is lost. The Campbell regulator is applicable to all sizes and types of boilers, water-tube, fire tube, horizontal, and vertical. After installation it does not require any adjusting because there is nothing that can get out of order.

Any type of pump governor may be used with this regulator—either the constant pressure or excess pressure type. Where one feed pump serves one boiler no pump governor is required, as the control valve, installed in the steam supply to the pump, governs the speed of the pump in accordance with the water demanded by the boiler.

Tests on the Campbell regulator were made at the Stevens Institute of Technology during 1925. The following is a portion of the report dated June 11, 1925, by Professor Robert M. Anderson, M. E., Professor of Mechanical Engineering:

"Your boiler feed control device installed in the feed line to the Smith boiler in the Carnegie Laboratory of Engineering has been continuously under our observation during thirty days, and has proved entirely satisfactory in its operation. The maximum fluctuation in the level of the water in the boiler has been approximately one inch.

"The change in the attitute of our boiler room crew towards the apparatus gives unsolicited testimony in its favor. At first it was just one more appliance to fuss with, but now all hands are anxious to know that it is to remain permanently."

The Atlas Valve Co., Newark, New Jersey, manufacturers of the Campbell regulator, have been manufacturing regulating devices for over 25 years.

The Nugent Marine Oil Filter

OUR illustration shows a Nugent marine oil filter that has many advantages in connection with the treatment of lubricating oil for marine diesel engines. This filter is of the bag type and is designed and constructed so that the bags may be renewed or cleaned with the minimum of time and effort.

The filter case is made of heavy steel either riveted or welded and enameled in any color to suit the customer. These cases are guaranteed not to leak under 10 pounds "head pressure."

Dirty oil from the engine enters the inside of the filter bag and flows through the bag, leaving the dirt on the inside. Should any bag become clogged a patent de-

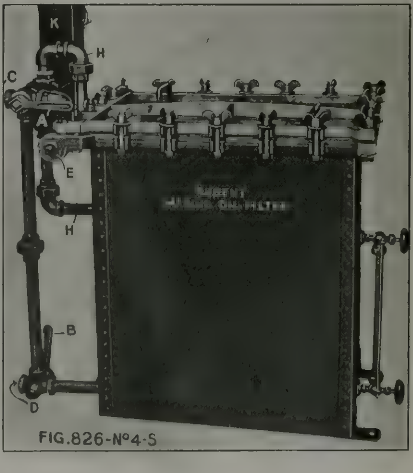


FIG.826-N°4-S

vice attached to the filter rings an alarm bell or lights a red lamp. The three-way valves A & B, as shown in the illustration, are then turned to send oil valves A and B, as shown in the illustration, are then turned to send oil through the by-pass pipe back to the engine. The cover of the filter is then removed by loosening the wing nuts, and frames with clean bags are substituted for those whose bags are clogged. The cover is clamped back into place, the valve returned to the operating position, and the filter is functioning again after a lapse of fifteen minutes maximum.

The dirty bags are then turned inside out on their frame and washed or cleaned with compressed air and placed on the rack of spare bags for future use.

Should a bag be worn out it can be very easily removed by pulling out two keys and another bag can be keyed onto the frame, all without the use of a tool of any kind. Should circumstances make it more desirable, an automatic by-pass with a large sight feed device can be substituted for the alarm and manually controlled by-pass as described above.

The cover to the Nugent marine oil filter is fitted with gaskets so that it clamps down on the top of each filter bag frame and absolutely prevents slopping over of the dirty oil in rough weather.

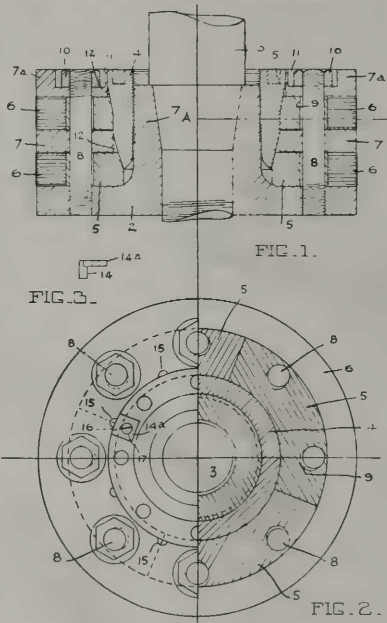
The Nugent marine oil filter is manufactured by Wm. W. Nugent & Company of Chicago, who have built a large line of oil filters, filtering systems, and oiling devices since 1897. They are now developing a precipitating and water separating chamber to be used in connection with the Nugent marine oil filter. The filters are made in all sizes up to 4000 gallons per hour and can be made in larger sizes if desired.

Patent Adjustable Pump Bucket

OUR attention has been drawn to a novel invention relating to the adjustment of pump buckets particularly adaptable to heavy duty pumps as applied to boiler feed or hydraulic service.

The inventor and patentee is a marine engineer of long seagoing experience and, being able to give his subject close attention under working conditions, has produced an article worthy of the attention of all concerned in the control and management of modern steam plants.

Briefly, the invention may be described as a bucket or piston fitted with solid composition rings capable of being stretched or expanded through the medium of segments which surround and which move simultaneously radially by a tapered central sleeve which engages with a corresponding taper of the segments, the tapered sleeve itself being adjustable on an externally threaded sleeve integral with a flange forming a bucket or piston head, and capable of being locked, which threaded sleeve is rigidly connected to the bucket or piston end of the rod. Reference to the drawing will clearly show the nature of the adjustment.



A cross section and plan showing construction of patent adjustable pump bucket.

To illustrate the advantages of this type of bucket over the usual type of solid bucket, at present predominant both ashore and afloat, the inventor, in a turbine steamer in which he recently served, had the two Weir feed pumps for supplying the main boilers, fitted with his improved buckets thereby effecting a saving in maintenance alone of 80 per cent. The rings of a 9¾-inch pump, having four Garlock rings in each bucket, each ring ½-inch deep and ⅞-inch wide, were found, after four months continuous duty, to be 0.010 inch slack in the chamber. Beyond removing the cover and valve gear, no dismantling was done and the rings were expanded to their limit with ease, the pump being set in motion again in exactly one hour.

The operation of expanding the rings in the solid type of bucket previously in use, entailed approximately six hours' work for an engineer and two helpers, necessitating the dismantling of practically the whole of the running gear.

Furthermore, it is to be noted that with continuous duty the rings wear at the rate of about 0.005-inch per month, and a monthly adjustment suffices to maintain ample tightness.

To quote the inventor's own words—"It is interesting to note that my bucket was fitted into a worn chamber when first installed, the chamber being 0.025-inch barrelled and 1/16-inch oval. At the present time, after 18 months' wear, I find the chamber to be absolutely parallel and within a fraction of being true circumferentially, demonstrating that a good fitting bucket will maintain a parallel liner. The amount of wear on the rings for that period amounted to 1/16-inch, and at that rate a set of rings are good for at least four years' continuous duty."

The practical engineer cannot overlook the fact that any engine room accessory requiring continual overhaul and renewal of parts is an expensive luxury, and unless that accessory, whether it be a ballast pump or a feed pump, is adjusted to maintain an efficiency of as near 100 per cent as possible, it means continuous and increasing loss.

In conclusion, the outstanding features of the invention may be briefly summarized:

Suitable for any composition rings.

Life of rings increased 6 to 8 times.

Rings adjusted in a minimum of time and with accuracy.

Rings wear chamber parallel at all times.

Adjusted without dismantling pump.

New rings fitted without removing bucket.

Impossible for bucket to seize in chamber.

No delicate parts to get out of order.

With the exception of rings, no parts subject to wear.

Announcement

Brig.-Gen. A. C. Dalton, president of the United States Shipping Board, Emergency Fleet Corporation, announced on September 16 that he had recommended to the Shipping Board that it call for bids for the reconditioning of the steamship America of the United States Lines, which was burned while in dry dock at Newport News in March. Mr. Dalton estimated the repairs could be done for $1,500,000, which he said probably would be covered by the insurance. The America will be transformed into a one cabin vessel.

Personal Paragraphs and Items of Interest

J. Sherman McDowell, Alameda publisher, has been named by Governor Friend W. Richardson of California to succeed M. F. Cochrane, deceased, as a member of the Board of State Harbor Commissioners of San Francisco bay.

McDowell is publisher of the Alameda Times-Star and has been active in politics and civic affairs for a number of years.

"I think it is particularly fitting that one of the members of the State Harbor Commission should come from Alameda county," Governor Richardson declared in announcing McDowell's appointment.

"J. Sherman McDowell has lived in Alameda for many years and is thoroughly acquainted with the great San Francisco harbor and its problems. He will make a fitting successor to the late M. F. Cochrane who served so ably and so well on the board during the past three and a half years."

Cochrane, former member of the commission and a San Rafael editor, died early in September.

F. G. Fitzgerald has just been appointed port engineer for the Southern Pacific Company, San Francisco, and has assumed charge of the engine room crews of a fleet of twenty ferryboats and river steamers operating on San Francisco Bay and the Sacramento River.

As chief engineer of the railroad ferries Solano and Contra Costa, which carry overland trains across Carquinez Straits, and in other engineering capacities, Mr. Fitzgerald has been in the company's service since 1891, when he commenced work as a fireman on an Oakland-San Francisco ferryboat. Prior to that time he was in the steamship coastwise service.

J. N. Joyce has joined the Cleveland Office of the **Bridgeport Brass Company,** located at 2017 Superior Viaduct, for the purpose of soliciting sales on Bridgeport-Keating flush valves and Plumrite brass pipe. Mr. Joyce is a graduate of the University of Cincinnati, a major in the Officers Reserve Corps, Aviation, and is familiar with the architects and plumbing contractors in the Cleveland territory. Before joining the Brass company, he was associated with the Johns-Manville Company.

The Columbia River Pilots' Association has elected two additional members, bringing the number of river polits on duty to 24. The new pilots are Captain Clyde Raabe and Captain Arthur Riggs, both veteran river steamboat men. Captain Raabe has been connected with the Portland Stevedoring Company for the past three years.

Norman F. Titus, manager of Claims-Insurance of the McCormick Steamship Company, San Francisco, who was recently appointed Chief of the Department of Transportation and Communications of the Department of Commerce, was the guest of honor at a dinner given under the auspices of the Foreign Trade Club of California, September 13, at the Commercial Club, San Francisco. Nearly 200 persons were present.

A beautiful basket of flowers was presented to Mrs. Titus, and a charm with the Foreign Trade Club's emblem was given to Mr. Titus. Judge Decatur said, in presenting them, "We give these to you with the love and affection of all of your friends in California."

After the banquet, all in attendance wished Mr. and Mrs. Titus godspeed.

Music was furnished through the courtesy of the Dollar Steamship lines.

Those at the speakers' table were Mr. and Mrs. Titus, Mr. and Mrs. Robert Newton Lynch, Mr. Koster, toastmaster; Mr. E. W. Wilson and Mr. Leonard B. Gary.

William L. Bunker has been appointed marine superintendent of the California Petroleum Company with headquarters at Los Angeles. Mr. Bunker was formerly superintending engineer of the United States Lines, and is well known on the Pacific Coast having formerly been a chief in the old Pacific Mail trans-Pacific fleet.

The Radio Corporation of America announces that R. C. A. direction finders will be installed on twenty-nine vessels of the fleet of the Standard Oil Company of New Jersey.

The United States Shipping Board has asked for bids to be submitted to the office of the Emergency Fleet Corporation, Washington, D. C., on October 12 for the purchase of the three tankers Cecil County of 7529 gross tons, the Hampton Roads of 7529 gross tons; and the Hoven of 7071 gross tons. The Hoven is offered for sale as a steamer; the two former tankers for sale as steamers or for conversion to direct diesel or diesel-electric drive.

The United States Shipping Board, at a meeting held August 26, decided to offer for sale and/or charter to American citizens the steamers of the United States Lines and the steamers of the American Merchant Lines and three others not in operation. Bids will be opened at the office of the Emergency Fleet Corporation, Washington, D. C., on November 8. The vessels to be sold are: the Leviathan, George Washington, Republic, President Harding, and President Roosevelt of the United States Lines; the American Trader, American Banker, American Merchant, American Farmer, and American Shipper of the American Merchant Lines; and the America, Mount Vernon, and Agamemnon, laid up.

New Coast Guard Chief.—Captain Frederick G. Dodge, who has been commander of the Northern Division of the United States Coast Guard with headquarters in Seattle for the last five years, has been appointed commander of the Southern Division of the Coast Guard with headquarters in San Francisco. He also will become captain of the Port of San Francisco.

Captain Dodge will be succeeded at Seattle by Captain John J. Berry, commander of the Gulf Division of the Guard.

Captain Dodge came to Stattle from the Southern Division of the Coast Guard. He formerly was inspector for the guard from Cape Flattery to San Diego. As commander of the Southern Division, Captain Dodge will succeed Capt. W. V. E. Jacobs, who has been retired.

Formal naval ceremonies were held September 1 at Bremerton for **Rear Admiral J. V. Chase,** commandant of the Navy Yard, who was detached from service there and left for San Francisco where he boarded the U. S. S. New Mexico as commander of Battleship Division No. 4. Admiral S. H. Robinson will take command of the Bremerton Navy Yard October 1.

The Kuhlman Electric Company, Bay City, Michigan, manufacturers of Kuhlman power, distribution, and street lighting transformers, announces the appointment of **H. F. Darby, Jr.,** as direct factory representative in the Philadelphia district. For more than twenty years, Mr. Darby was with the Cutter Electrical and Manufacturing Company and during the last six years he was sales manager of that organization.

The Kuhlman company also announces the establishment of a factory office at 3-260 General Motors Building, Detroit. **Richard P. Johnson** will have charge of this office.

Ivan Stewart Forde, who for a number of years was manager of the Small Turbine Division of the Westinghouse Electric & Manufacturing Company, and for the past three years manager of the Sales Promotion Department of The Diamond Power Specialty Corporation, has resigned to become affiliated with the **Furnace Engineering Company,** manufacturer of the Simplex Unit Pulverizer, as sales manager, with headquarters at 5 Beekman Street, New York City.

Marine Insurance

Edited by JAMES A. QUINBY

"Collision" A Marine Insurance Term

THE term "collision" is one we have always with us, but the repetition of certain problems in connection with its definition leads us to the conclusion that it resembles electricity and bootleg liquor in that the longer we have it the less we know about it.

A maritime collision has at various times been defined as "violent contact" of a ship or vessel with a foreign body, "a coming together," and as an "impact". The Supreme Court has said that it contemplated the "impinging of vessels together while being navigated."

It certainly includes the contact of a ship with any other floating body, such as a raft, float, or barge, as well as with another ship. It also includes a casual meeting with certain stationary objects, such as bridges, docks, or buildings. It does not, however, cover impacts with rocks, shoals, or other natural formations, which come within the category of strandings.

Some of the decisions on this latter point are remarkably recent. In the Honeybrook, 1924 A. M. C. 589, affirmed in 1925 A. M. C. 717, a careful analysis of collision coverage is found.

That case represented an attempt to recover as under a tower's liability policy, payments made for certain damages suffered by barges in tow, caused by striking against the rip-rap, or artificial sides of the canal. In order to recover, the assured had to show that the damage resulted either from a stranding or from a collision. The lower court very properly threw out all question of stranding, inasmuch as it did not appear that the barges struck and remained fast at any time.

Efforts on appeal were therefore undertaken with a view to establishing that the damage arose from a collision as included in the policy, which provided:

"......it is further agreed that if the vessel hereby insured or her tow shall come into collision with any other vessel, craft, or structure, floating or otherwise......and the assured .... shall in consequence thereof become liable to pay .... etc."

Striking Canal Bank Not Collision.

The Circuit Court of Appeals held that the set of facts presented did not disclose a collision within the meaning of the term as interpreted by maritime and insurance law. Interesting excerpts and references from the decision are as follows:

"In 11 C. J. 1011, it is said that 'In its strict nautical and legal acceptation the term 'collision' means the impinging of vessels together while being navigated; two navigable things coming into contact; the act of ships or vessels striking together; the striking or running afoul of one ship by another'."

"In Cline vs. Western Assurance Company 101 Va. 496, the action was upon a marine policy insuring a ship against loss caused, among other things, by collision. It was charged that the ship had collided with some sunken or floating obstruction in a river. It was held that striking a 'sunken or floating obstruction' was not a collision within the meaning of the policy. The authorities were quite fully reviewed.

"Some of the courts of the State of New York have given to the term 'collision' a somewhat broader significance than the courts of England or the United States. In a recent case, 'steam tug John O. Carroll vs. Aetna Insurance Company, 1923 A. M. C. 77, the court had before it the question of whether accidental contact between a vessel and a floating but non-navigable object constituted a collision within the meaning of that word as used in a policy of marine insurance. The court decided that it did and said that there was no hardship in giving to the word 'its ordinary and generally accepted meaning'."

In the case of Newtown Creek Towing Co. vs. Aetna Insurance Company, 163 N. Y., 114, the New York Court of Appeals, reversing the Appellate Division, held that striking a cake of ice was not a collision, relying chiefly upon the ground that in the case at bar it was not shown that the damage was accidental. The court there said:

"Collision, in its strict nautical and legal acceptation, originally meant the impinging upon one another of vessels while being navigated, but in the course of time and by common usage the application of the term has been so far extended, in this country at least, as to include the impact of a vessel with other floating objects......

"However, whether the term be treated by the courts as so fixed in character as to be restricted in its meaning to the coming together of two vessels, as in the rule in France, or so flexible as to include a variety of floating objects other than vessels, the idea of accident so far as the assured is concerned underlies it."

The Underwriter—Water Man

After "Mother Goose"—('Way after).

Where saffron clouds of romance dim the ports of far Cathay,
A hundred rusty tramps are reeling down to Mandalay,
And each and every one of them is mine from keel to spar—
The very cargoes in their holds my goods and chattels are.

I own the cakes of soya beans from Harbin's wasted hills,
And musty drums of China oil from Sechwan's rustic mills.
The senna leaves, and grey daisee, and lichi nuts and ghee,
The ginseng roots, opoponax, and hemp, and gingili.

Jugs of sweet perilla oil, cutch and jelutong,
And scented lengths of carven wood from out of Chittagong.
Cocabola, sisal strands, and cloves from Jalapang
Anise seed and copra meal, cashew nuts and bhang.

My ownership's precarious
At most 'tis but vicarious,
Though many people try their best to sell these things to me—

Of their ways and means nefarious,
I cautious am, and wary, as
I seldom buy things outright till they're sunk beneath the sea.

J. A. Q.

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The court in the Honeybrook case then goes on to hold that the New York cases are distinguishable, and that no recovery could be had under the terms of the policy.

It has been held that the contact of one ship with the anchor of another while the second vessel was lying at anchor constituted a collision. It has also been held that damage to the nets of a fishing vessel by a steamer while the fishing vessel was fast to her nets, but at a distance of a quarter-mile, could not base a recovery by the fishing vessel as for a collision under her hull policy.

Local Examples of Queer Collisions.

Nor do the recorded cases exhaust the field of controversy in this apparently simple question of collisions. Cases are arising every day which are settled out of court, leaving a trail of argument in their wake.

A string of fishing boats, moored together at a wharf near Wilmington and held apart by rope fenders, are injured by grinding together during heavy weather. Is this a collision? As we recollect it, the underwriter had serious doubts, and the assured eventually dropped the claim.

A small boat, regularly carried by a steamer as a lifeboat, puts off from the side of the mother ship during lifeboat drill and is struck by another vessel and demolished. Can this be recovered under the hull policy of the mother ship as being a collision damage to part of her equipment? We believe the underwriter paid this one, after carefully crossing his fingers and writing "without prejudice" all over his check.

In its July number, Pacific Marine Review published a snapshot of two barges, one of which had tilted at her moorings, vaulted over on her side, and landed upside down on the deck of the other. Readers are requested to mail in their votes to Aunt Aimee as to whether this is a collision. Neither policy contained an aircraft clause.

New York Court Defines Collision.

In the recent case of Tice Towing Line vs. Western Assurance Company, 1926. A. M. C. 904, a New York state court indicated that the continued pounding together of barges in tow constituted a collision within the meaning of that word as used in a tower's liability policy.

The sixteen barges involved in that case were being towed by Tice tugs from Staten Island Sound through New York Bay to a pier in the East River and were in tiers of three abreast. One of these, the No. 6 in the first tier, was so severely damaged by pounding and chafing against the other barges that her seams opened and she sank before she could be brought to her destination.

The barge owner sued the Tice Line, which limited its liability under the Federal Limitation of Liability Act, and subsequently asserted its right to recover the sum so determined from underwriters who had issued tower's liability collision policies covering the tugs in question.

Among other points of defense, the insurers contended that the pounding was not a collision within the terms of the policy.

In considering this angle of the case, the court comments as follows:

"There was considerable argument at the trial as to whether or not pounding was collision within the meaning of the terms in the policies. There is an express insurance against legal liability of these tugs when the liability is ceased through injury to two vessels and their cargoes, both of which are in tow of the tug, through a collision. Where a collision occurs between two vessels in the tow, such collision from the very nature of their inactive character by reason of having no motor power means one resulting from a bumping or pounding together. This type of collision must necessarily be the nature of the collision referred to in the policy, since one of the warranties required of an assured by the insurer is that it is to properly fasten, moor, or lash vessels with proper fenders or other appliances, when two are towed together, so as to prevent their injuring one another by chafing, bumping, pounding, or riding. This requirement indicates that it was within the contemplation of the insurance company that pounding was to be included within the term 'collision,' else this warranty in the policy and the inclusion of an indemnity for liability against collision between boats in the same tow were meaningless. Collision also includes in its definition the 'impinging of vessels together while being navigated.' Any violent contact of a vessel with another vessel in whatever manner produced is a collision, except such contact as is brought about by design. If the policy, however, admits of two constructions, there is no doubt that under the rule of contra-preferentem that construction should be adopted which will indemnify the insured.

"It has been held in Admiralty that a vessel lying at her moorings, which is violently rubbed or pressed against by another vessel lying alongside her, in consequence of a collision occuring between the second vessel adjoining and a third vessel under way, has been collided with by the second vessel. It seems, therefore, that the indemnity for liability in the policies included this form of collision known as pounding.

Effect of Tower's Liability Clause.

It is to be noted that the decision in the Tice case is under policies bearing the tower's liability clause, which is not commonly written on the Pacific Coast.

Under this clause, the specific provision for fenders, etc., as a protection against pounding, no doubt influenced the court's definition, which is however, sufficiently broad to include almost any contingency.

We await with interest the case of a vessel lying at anchor which has her wireless aerial carried away by an airplane.

Dangers of C. I. F. Contracts

WE have taken occasion, from time to time, to point out in these columns the superior position of the importer who arranges his own marine insurance in place of depending on the shipper to obtain adequate protection at the point of origin. The consignee of goods bought c. i. f. is usually forced to proceed through the shipper in establishing his loss, and is deprived of the leverage which would be afforded by personal contact with his insurer.

The aid of the shipper may be cheerfully given while relations are cordial, but if the bottom falls out of the market,

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it is very apt to be a case of every man for himself. Arguments over such trifling matters as the failure to provide appropriate or adequate insurance may then find their way into court, bearing a generous share of grief for the shipper as well as the consignee.

In Western Grocer Company vs. New York Overseas Company, 1926 A. M. C.—1060., the plaintiff agreed to buy from the defendants some eight hundred tons of Java sugar, authorizing the sellers to draw on an established letter of credit with the Corn Exchange National Bank of Chicago, for the invoice cost of the goods c. i. f. San Francisco.

Conditions made for a glut of the sugar market, and prices dropped. When the resultant clouds of dust, sugar, and profanity had cleared away, the defendants were frantically trying to unload twice the amount called for by contract, and the buyers were just as frantically trying to crawl out from under. At this juncture, it was found that certain details of shipment had not been scrupulously executed by the shipper. The shipping documents were late, and the insurance had not been taken out until the goods were well on their way. The defendant was not, apparently, equipped with an open policy.

Breach of C. I. F. Conditions.

Judge Kerrigan, in censuring the defendant's conduct, used the following terms:

"The second count alleges that insurance was not taken out, either within six days of the vessel's sailing or in a sufficient amount. This, argues defendant, is immaterial, because the goods arrived in safety and plaintiff suffered no loss. But the law is clearly otherwise. Under a c. i. f. contract it is the duty of the vendor actually to insure the cargo in order to comply with the terms of his agreement. Such compliance is a condition precedent to the attachment of any liability on the buyer to accept the goods. Hence although the cargo in fact arrives safely, the buyer may refuse to accept it on the ground that no insurance was effected."

When is a Peril Not a Peril?

NO discussion of general average and its allied perplexities is complete without some mention of the two outstanding cases in which British and American courts have had to deal with the interesting question as to whether a sincere and reasonable assumption of peril is sufficient to justify a general average sacrifice when no peril in fact exists.

These two cases—the Siamese twins of the problem—find the American tribunal answering the question in the affirmative, while the English court denies the general average.

In the Wordsworth, 88 Fed. 313, the District Court in New York was handed a prize package containing a brand new cross-word puzzle. The Wordsworth left New York for Rio de Janiero on October 12, 1895, laden with general cargo, chiefly flour, of which four thousand barrels were stowed in forward No. 1 hold.

During the first two days of the voyage, she met a heavy, confused sea and shipped much water over the bows. At 5 P. M. on the 13th, the carpenter reported the forepeak full of water. This compartment held 150 tons. It had quite evidently filled some time after noon of the same day, when it had been examined and found dry.

The master was alarmed and finding no apparent reason for the presence of water in his ship, arrived at the conclusion that she had been stove in forward by the pounding of heavy cross seas. His testimony reads, "I said to myself, it must be below the water, the damage. I then said to myself, knowing that the upper part of the vessel was in a good condition, if it is, as I suppose, a hole below, I must open all the sluices and let the water run back to the engine room where they have powerful pumps, and put back to New York."

The sluices of the collision bulkhead were accordingly opened, so that the water entered No. 1 hold and damaged the flour stowed there, in spite of the powerful pumps mentioned by the master. The master must have known this damage would ensue, so the chief elements of a voluntary sacrifice were present.

On examination, however, it was found that the forepeak was tight, and the trouble arose from a leak in a hawse pipe. The leak was repaired, and the vessel proceeded.

The right of the cargo owners to a general average allowance for their loss was upheld by the court, who commented as follows:

"In other words, a situation of damage to the whole enterprise was believed to exist, and did apparently exist, such as apparently required this sacrifice to be incurred; and it was upon that judgment and belief that the sacrifice was made, and made as was supposed and understood at the time, necessarily in the interest and for the safety of all concerned.

"This is sufficient to support a general average charge, where the judgment of the master was in good faith, as is here evident, and was formed upon reasonable grounds."

The decision is quite evidently founded upon a wholesome reluctance to criticize the master's judgment, an idea pithily expressed in a much later case. The Mary F. Tracy, 298 Fed. 528, where Judge Mayer says, "It was argued that the captain should have done one of several things other than to go ahead with all the power at his command. I think he decided on the best plan, but whether he did or not, his decision was the result of a fair exercise of judgment under very difficult circumstances. The contrary view as testified by Captain Nott called as an expert is but the old story of being able to tell, after the event, what should have been done, where the critics were not there, and were not confronted with the problem nor the emergency. There is always a Captain Nott. Sometimes he sits by the cozy fireside, and sometimes he testifies in a court-room. He recites how it could have been better managed, but, if the responsibility had been his, he would have been worried sick, and probably would not have done half so well."

British Court Differs.

In the English case, Joseph Watson and Son vs. Fireman's Fund Insurance Company, reported at 28 Com. Cas. 73, 1922, the court was faced with a similar set of facts.

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The Fireman's Fund were the insurers of a quantity of rosin from New York to Hull, under an ordinary marine policy covering, among other things, damage by fire. In the course of the voyage, steam or vapor was seen to be arising from the hold in which the rosin was stowed, and the master, believing the cargo on fire, had high pressure steam turned into the hold, causing extensive damage to the rosin. There was in fact no fire.

Claim was made under the policy as for a general average loss. Payment was resisted on the ground that no peril existed.

The court held that there was no liability under the policy, first, because under Sec. 66-(2) of the Marine Insurance Act, there was no peril, and, second, because under Sec. 66-(6) of the same Act, the insurer could not be liable for the expense of avoiding a peril which was not a peril insured against.

The sub-sections mentioned read as follows:

"(2) There is a general average act where any extraordinary sacrifice or expenditure is voluntarily and reasonably made or incurred in time of peril for the purpose of preserving the property imperilled in the common adventure."

"(6) In the absence of express stipulation, the insurer is not liable for any general average loss or contribution where the loss was not incurred for the purpose of avoiding, or in connection with the avoidance of, a peril insured against."

Can the Decisions Be Reconciled?

Many writers, including the editors of the latest edition of Arnould, have endeavored to distinguish these cases on one or more of the following points of difference:

(1) In the Wordsworth there was an actual peril; i. e., a vessel at sea with her forepeak full of water, while in the Fireman's Fund case there was no peril whatever.

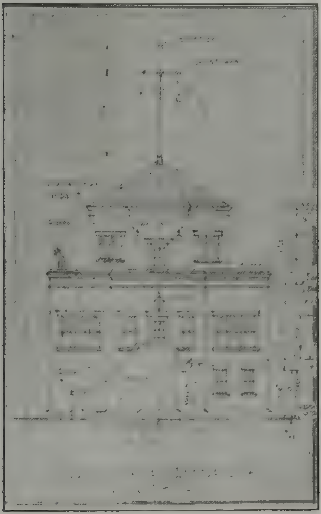
But the officers of the Wordsworth testified that even had the collision bulkhead broken down, the only result would have been greater damage to the cargo in No. 1 hold, and the ship could have proceeded safely to Brazil.

(2) The master of the Wordsworth acted in a reasonable manner, while the amateur firemen in the rosin case were a wee bit hasty.

(3) The English court, in 1922, was governed by the Marine Insurance Act of 1906, which was not a factor in the Wordsworth case.

The cases are, on their facts, diametrically opposed. There is this much to be said for the Fireman's Fund case, however. It is a much later decision, and it occupies the relatively favorable position of expounding the clear cut provisions of statutory law. If a similar case were to arise today, even in this country, the words of the English court might be accorded enough weight to undermine the Wordsworth decision.

NEW MARINE OBSERVATORY



For some time past the marine observatory of the San Francisco Chamber of Commerce, located at Point Lobos, San Francisco, has been in a condition not very conducive to pride on the part of the chamber. Sentiment to put up a new building in a location on the opposite side of the boulevard and higher up on the bluff has crystallized in the design which is shown in our illustration. These plans were prepared by J. D. Stigen, of the Marine Department of the Standard Oil Company, and the building is to be erected under the direction of the Marine Exchange of the Chamber of Commerce. As will be noted from the plans, it is octagonal in shape, the lower floor being devoted to living quarters for the observer, and the second floor to the observation room itself. The design is practical and very pleasing in appearance, and the building will form a substantial addition to the usefulness of the Marine Exchange.

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Phone Douglas 6313

Freights, Charters, Sales

September 15, 1926.

DURING the last week the United Kingdom and Continent wheat market has opened with great activity. Liner space jumped rapidly from 30/- and 32/6 to 35/- and most of the liners are well booked up to January. Charterers are bidding 33/- for cargoes with owners holding for 35/- and one fixture has been reported at 34/- for November.

Japan lumber is quiet and quoted at $9.50 with wheat at $4 for Sept./Oct.

Australian lumber charterers are bidding $12 to $12.50 for tonnage without success at present, but should the Australian wheat market become active with rates to U. K./Continent at 45/-, owners might accept lumber down at $12 to obtain the high homeward wheat freight.

The West Coast of South American lumber is being taken care of by the liners at $13.

The intercoastal lumber is paying $14 for American tonnage and $13 for foreign although the latter is figured mostly on time charter basis.

The following steamers are reported fixed with grain to the U. K./Continent: British s.s. Riol, Sept., Kerr Gifford & Co.; British s.s. Sithonia, 31/3, Oct/Nov.; Japanese s.s. Chifuki Maru, Sept., Balfour Guthrie & Co.; British s.s. Callandia, 31/3, option Prince Rupert loading 32/-, Oct./Nov.; 2 Japanese s.s., same; British s.s. Baron Andrassan, Sept., Wilmer Grain Co.; British s.s. Singapore Maru, Sept./Oct.. Balfour Guthrie & Co.; British s.s. Baron Elcho, Oct./Nov., Strauss & Co.; Japanese s.s. Liverpool Maru, Wilmer Grain Co.; British s.s. Benavon, Sept./Oct., Kerr Gifford & Co.; Japanese s.s. Karachi Maru, Sept., Suzuki & Co.

For grain to the Orient the following fixtures are reported: Japanese s.s. Reiyo Maru, Japan, relet, Sept., Kanematsu Co.; Japanese s.s. Taiyu Maru, Shanghai, Oct., Mitsubishi & Co.; Japanese s.s. Texas Maru, Yokohama/Moji Range, Oct.; Japanese s.s. Ryujin Maru, same, Oct.

The following fixtures are reported with lumber to Australia: American schr. K. V. Kruse, Canadian Transport Co.; Norwegian m.s. Hinnoy, $12.50, Sept./Oct., American Trading Co.; Danish s.s. Bolivia, Nov., J. J. Moore & Co. Inc.; British s.s. Harrdale, same.

The following steamers are reported fixed with lumber to the Orient: Norwegian m.s. Handicap, relet, $9.50 Sept,, Dant & Russell; Japanese s.s. Boston Maru, Aug./Sept., Nakagawa & Co.; Norwegian m.s. Brynje Maru, Oct., Suzuki & Co.; Japanese s.s. Taigen Maru, (ex Luis Nielsen) Oct., Canadian Trading Co.

The American schr. North Bend, is reported fixed from Grays Harbor to Callao with lumber, Nov./Dec. loading, by Darling, Singer Lumber Co.

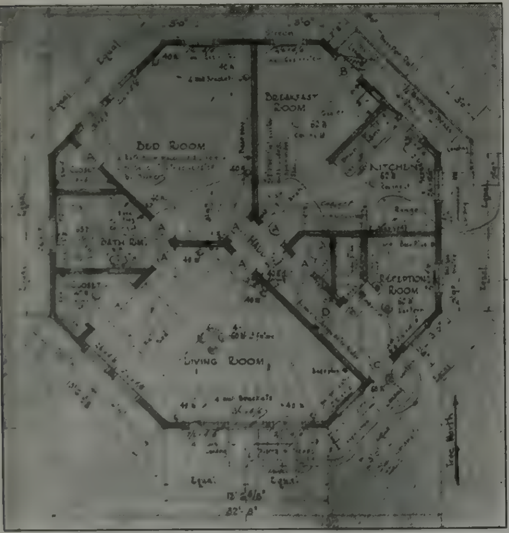
British s.s. City of Victoria is reported fixed from British Columbia to North of Hatteras, lumber, Sept. loading, W. L. Comyn & Co., and the American s.s. Onondaga from Puget Sound to New York, South Alberta Lumber Co.

The Finnish bktn. Pommerin is reported fixed from Puget Sound to South Africa, Sept./Oct. loading, lumber, J. J. Moore & Co. and the British s.s. Suveric from North Pacific to South Africa, Sept. same charterers.

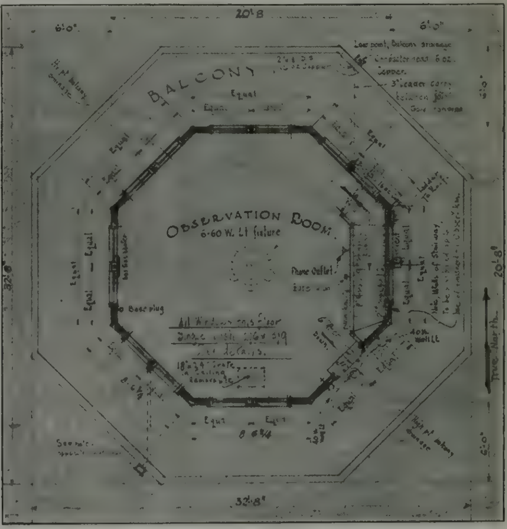
The following time charters are reported: Danish s.s. Nordlys, delivery British Columbia, Sept., redelivery North of Hatteras, 1 trip, $1.25; Norwegian s.s. Hermion, Pacific trade, 4 or 5 months, delivery North Pacific, redelivery Australia, 95c, Aug.; Greek s.s. Maria Stathatos, 1 trip, delivery North Pacific, redelivery Australia, lumber, Nov./Dec., W. L. Comyn & Co.; Scandinavian m.s. Pacific trade, 9 months, delivery North Pacific, redelivery Australia, $1.30, Aug./Sept.; British s.s. H. H. Asquith, delivery British Columbia, redelivery North of Hatteras, Sept., South Alberta Lumber Co.; Danish s.s. Chastine Maersk, North Pacific to Australia, $1.30, Oct., Balfour Guthrie & Co.; British s.s. Eastern City, two ports North Pacific to two ports Australia, delivery Japan, Aug., W. L. Comyn & Co.; British m.s. Vinemoor, North Pacific to Australia, $1.60, Union S. S. Co.; American s.s. El Capitan, North Pacific to Gulf ports, 1 round trip, Sept., Swayne & Hoyt; Danish m.s. Stensby, Pacific trade, 15/18 months, delivery and redelivery United Kingdom, Sept., W. L. Comyn & Co.; British s.s. British Monarch, Pacific trade, delivery British Columbia, Sept., Canadian Transport Co.; Japanese s.s. Ishin Maru, trans-Pacific trade, Sept., Canadian American Shipping Co.; British s.s. Queenswood, Pacific trade, Sept., same charterers.

The following steamers are reported sold: American s.s. President Arthur, United States Shipping Board to Los Angeles S. S. Co.: American schr. Alvena, Capt. A. C. Wilvers and C. H. McCarthy to W. D. Roberts of Baltimore.

PAGE BROTHERS, Brokers.



Plan of first floor, new marine observatory, San Francisco.



Plan of observation room and balcony, new marine observatory, San Francisco

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

CONTRACT PLACED FOR FERRYBOATS.

The Golden Gate Ferry Company, 58 Sutter Street, San Francisco, Harry Speas, manager, has awarded contract to the General Engineering & Dry Dock Company of San Francisco and Oakland for the construction of three diesel-electric ferryboats for San Francisco Bay service.

The diesel engines will be supplied by Ingersoll-Rand Company and the electrical equipment by the Westinghouse Electric & Manufacturing Company.

The boats are to be 240 feet overall, 44 feet molded beam, 17 feet molded depth. The propulsion power will be practically the same as for the ferryboat Golden State, recently completed; namely, three diesel engines of about 400 horsepower each connected to electric generators. Electric power will be supplied to two motors, one for each propeller, to be of about 950 shaft horsepower each.

In addition to the contract for additional ferryboats and with all legal and other obstacles reported removed, work is expected to begin immediately upon the long-proposed Berkeley-San Francisco automobile ferry for the Golden Gate Ferry Company. The first step, consisting of the construction of a concrete trestle, three and one-half miles in length, at the foot of University avenue, Berkeley, will be taken soon, according to A. O. Stewart, president of the Golden Gate Ferry Company.

The contract for the trestle has been awarded to the San Francisco Bridge Company on a bid of $702,000, and the casting of concrete jackets for the trestle piling is expected to be under way shortly.

Bids for the construction of slips and buildings at the end of the Berkeley pier are now being received, and contracts will be awarded for this part of the work by October 1. The completion of the pier, with slips, sheds, and wharves, will be brought about immediately upon the completion of the trestle. Its estimated cost is in the neighborhood of $1,000,000.

FERRY STEAMER PLANNED

The Martinez Ferry Company, Martinez, California, are preparing plans for the construction of an automobile and passenger ferry steamer to operate between Martinez and Vallejo.

TENDERS TAKEN FOR DIESEL ENGINE INSTALLATIONS.

Bids for the installation of Busch-Sulzer diesel engines in two Shipping Board vessels were opened September 1 at the office of the Emergency Fleet Corporation, 45 Broadway, New York. Five bids were submitted, as follows:

Morse Dry Dock & Repair Company, $417,950 and 130 days for installation on the steamer Seminole.

Newport News Shipbuilding & Drydock Company, $794,000 for installation on the City of Dalhart and the Yomachichi, first in 140 days, second in 165 days. Bids were submitted for separate installations — $399,600 for the City of Dalhart and $415,500 on the Yomachichi.

Sun Shipbuilding Company, $474,000 and 120 days for installation on the Seminole.

Tietjen & Lang, $479,590 and 120 days for installation on the Seminole.

Bethlehem Shipbuilding Corporation submitted several bids: (1) $535,550 and 120 days for installation on the Yomachichi and $532,850 and 120 days for the City of Dalhart; (2) a total cost of $1,035,000 for both vessels if first is allowed 120 days and second 135 days; (3) $491,550 for installation on the Yomachichi if 185 days allowed and $492,850 for the City of Dalhart if 185 days allowed; (4) total cost of $955,000 if 185 days allowed for the first installation and 195 for second.

IMPORTANT ENGINE ORDER.

Ingersoll-Rand Company, 11 Broadway, New York, have recently received a contract from the Panama Canal Commission, Washington, D. C., for four 6-cylinder mechanical injection type diesel engines. The engines are to be installed in two 125-foot tugboats now building at the Panama Canal shipyards at Cristobal, Canal Zone. The engines are to be of 480-horsepower each and the total price is $163,013.36 delivered at Cristobal.

Standard Transportation Company, 26 Broadway, New York, are reported to be preparing plans and specifications for an oil tanker.

O'Brien Bros. Towing Co., 233 Broadway, New York, will open bids about the middle of September for a steam tugboat of steel construction. The boat will be 121 feet long, 27 feet beam, and 14 feet 6½ inches depth, powered with triple expansion engine, steam being supplied by one Scotch boiler. secured.

The United States Army Engineers, St. Louis, Missouri, opened bids September 15 for six steel barges 152 feet long by 34 feet 2 inches beam, by 6 feet depth, to be delivered at Cairo or St. Louis.

Another self-propelled barge for bulk delivery of crude and refined oil in New York harbor will be built for the Tide Water Oil Company, 11 Broadway, New York, on which bids have been asked by R. H. Jones, marine manager. The vessel will be 258 feet 8 inches over-all, 252 feet between perpendiculars, 40 feet beam, and will have capacity of 10,000 barrels of oil. Diesel engines are to be installed and bidder may specify any one of several makes, Winton, McIntosh & Seymour, or Nelseco.

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STEEL FERRY STEAMER FISHER'S ISLAND.

The passenger and automobile ferryboat Fisher's Island, which is being built for the Fisher's Island Navigation Company, was launched at the Harlan plant of the Bethlehem Shipbuilding Corporation, Ltd., Wilmington, Delaware, on July 22, 1926, Miss Carroll H. Ferguson, daughter of Alfred L. Ferguson, one of the owners, acting as sponsor.

The Fisher's Island is designed to handle passenger and automobile traffic between New London, Connecticut, and Fisher's Island.

The principal dimensions of the vessel are as follows:

Length overall	159′ 0″
Length between perpendiculars	150′ 0″
Breadth molded on deck	40′ 0″
Breadth molded on load water line	31′ 0″
Depth molded at side	15′ 6″
Draft loaded	10′ 0″
Freeboard	5′ 6″

The vessel is a single screw steamship with a straight stem and tugboat stern, with one complete steel deck fore and aft and monkey forecastle. The lower deck aft is fitted up to accommodate passengers. The pilot house on the boat deck. The vessel has four water-tight and two oil-tight bulkheads. There are listing tanks at each side of the fuel oil tanks. Should it be necessary to turn the vessel at any time into a coal burner, the listing tanks will form the bunkers and will hold twenty-tons of coal in each bunker. The after peak will be used for trimming tank and three tanks forward of the boiler room bulkhead, which extends to the fore peak bulkhead, will have water sub-divided in compartments for feed water, reserve feed water and trimming tank.

Main Engine: The propelling engine is of the inverted cylinder, vertical direct-acting, triple expansion type; high pressure cylinder 17 inches in diameter, intermediate pressure 25 inches in diameter, and low-pressure cylinders 43 inches, the stroke of the cylinders to be 30 inches.

Propeller: Propeller is four-bladed, right hand, solid cast iron, 9 ft. 0 ins. diameter and 12 ft. pitch.

NEW MOTOR YACHT SIELE.

The steel motor yacht Siele, designed by B. T. Dobson, of New Bedford, Massachusetts, was recently built by the Pusey and Jones Company, Wilmington, Delaware, for John H. French of Detroit.

The Siele embodies the last words in yacht design and construction for a vessel of her size. Her dimensions are 124 feet length over-all, 20 ft. 6 in. beam, and 7 feet draft when fully equipped. This vessel, with her overhanging stern, slightly raking bow, and extremely flaring forward sections, combines a striking appearance with the necessary essentials that make her a splendid seagoing craft. The hull is substantially constructed of steel, having teak decks laid over steel beams and plates, teak deck houses, steel framed shade deck with teak pilot house thereon, a departure on yachts of this size.

Fuel oil and fresh water are carried in deep tanks built in with the hull structure. These, with the transverse steel bulkheads, divide the yacht into seven water-tight compartments.

The owner's accommodations consist of a large dining room in forward deck house with galley and pantry and a large living room in after deck house with radio room, all on the main deck. There are three double staterooms, three single staterooms, and four bathrooms.

The dining room and living room are and quarters for officers are located finished in selected paneled walnut, these rooms having large plate glass windows. The rooms below deck are paneled and finished in ivory with walnut doors and trim. The furniture in all of the rooms is of walnut, having been designed specially for their respective locations, and with carpets, upholstery, draperies, electric fixtures, and hardware all selected to harmonize and produce a pleasing effect. Forward of the owner's quarters accommodations are provided for officers and crew.

The propelling machinery consists of two 6-cylinder, 300 shaft horsepower, Winton diesel engines. Auxiliaries are electrically driven, electric current being supplied by two 7½ kilowatt generators driven by 6-cylinder gasoline engines.

RECENT SHIPBUILDING CONTRACTS.

The Southern Pacific Company on September 18 announced that it had let a contract for the construction of three new steel ferryboats to add to its present fleet of 23. The successful bidder was the Bethlehem Shipbuilding Corporation, Ltd.

This contract is part of an order for six boats for the Southern Pacific and Northwestern Pacific, each company to have three boats. The new boats contracted for will be for the transbay transportation of automobiles, and each boat will have capacity for 95 cars. The cost of the new boats fully equipped will be about $525,000 each. The first boat will be completed by March 1, 1927, and the second boat by April 15, 1927.

The boats will be of diesel-electric drive of steel construction, 256 feet long, and 66 feet beam. On another page of this issue will be found a general plan of the boats. Nelseco diesel engines will be installed, furnished through King-Knight Company, San Francisco. There will be four engines to each boat, each of 450 horsepower, each connected to a 275 kilowatt direct current General Electric generator and a 40-kilowatt exciter. The Nelseco engines are to be of the 6-cylinder, 4-cycle type with mechanical injection. Current from the four generators will be supplied to two main propelling motors located fore and aft, each of 1250 horsepower. The boats will be equipped with the Ward-Leonard type of pilot house control. All auxiliary equipment is to be electrically driven.

All equipment on these new ferryboats will be of the latest design. On the upper deck will be commodious women's and men's saloons, smoking room, and a large comfortable dining room, with electrically equipped galley.

W. F. Stone & Son, Oakland, Calif., have orders for three new boats. One is a de luxe yacht for John Borden of Chicago. The boat will be 140 feet between perpendiculars, 30 feet beam, and 14 feet loaded draft. She will be powered with diesel engines of 360

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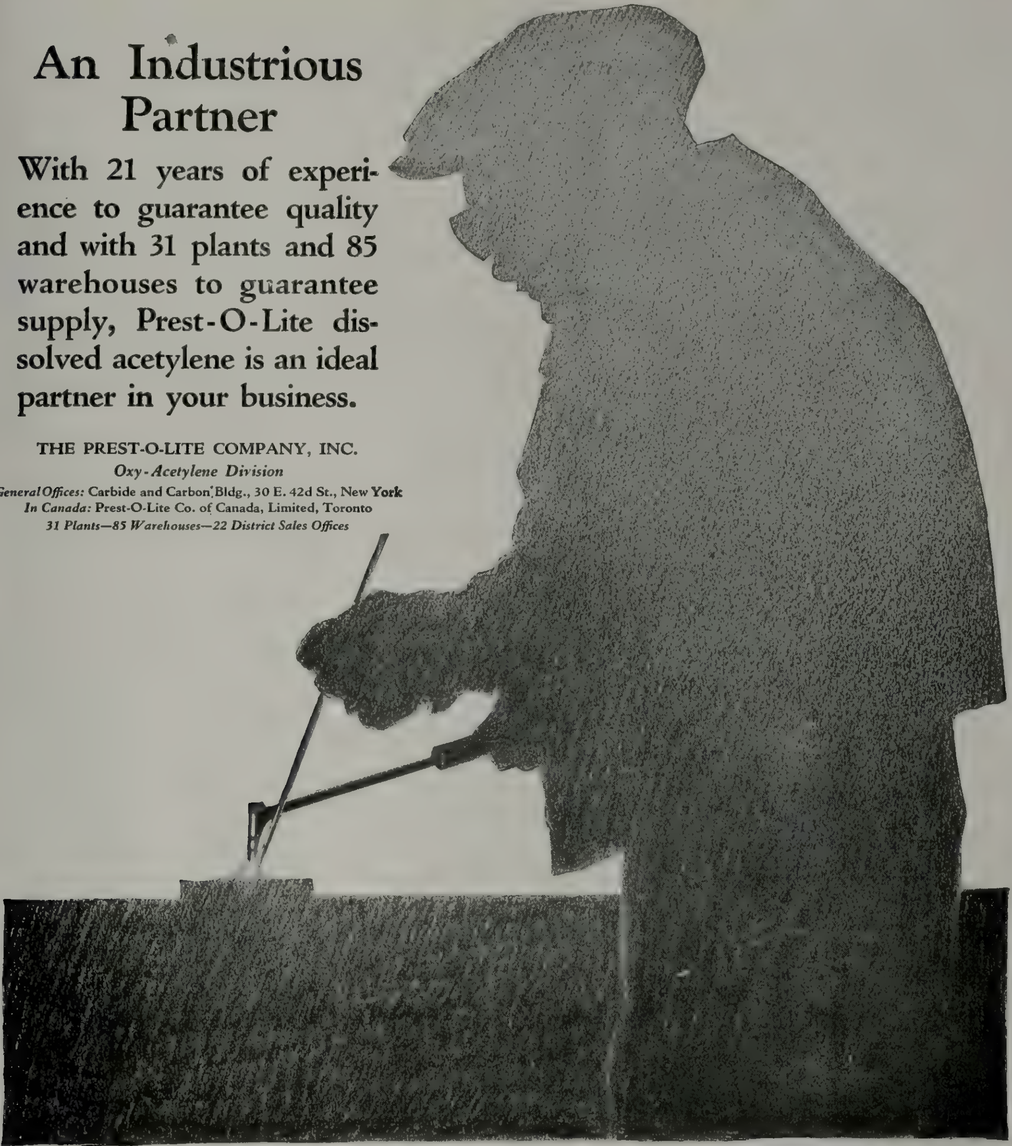

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indicated horsepower giving a speed of 10 miles. Keel will be laid in September.

This yard also has an order for a passenger boat for Captain Fred Lewis, to be 50 feet long, 14 beam, and 3 feet 6 inches loaded draft.

The third boat is a yacht for Frank B. Drake to be 55 feet between perpendiculars, 13 beam, and 6 loaded draft. She will have 30 indicated horsepower gas engines and a speed of 7 miles. The keel for this latter yacht was laid August 25.

J. C. Johnson Shipyard, Port Blakely, Washington, has an order for three scows for the Reed Mill Co., Shelton, Washington.

American Bridge Company, Pittsburgh, Pennsylvania, reports an order for five coal barges for the Wheeling Steel Corporation, 140 by 26 by 10 feet to be delivered in November.

Bethlehem Shipbuilding Corp. Fore River Plant, Wilmington, Delaware, has an order for an oil barge for the Seaboard Shipping Corp., 170 by 37 by 12 feet 6 inches. The barge is to have a capacity of 10,000 barrels of oil and delivery will be made January 1927.

Dravo Contracting Company, Pittsburgh, has an order for two pile driver hulls for Fruin-Colnon Contracting Co., St. Louis; also an order for fourteen steel barges for the Mississippi River Commission at Memphis, the latter to be 120 feet by 30 feet by 7 feet 4 inches and of 430 gross tons.

Howard Shipyards & Dock Company, Jeffersonville, Indiana, has an order for a concrete mixer hull for the Mississippi River Commission, at St. Louis, to be 120 feet long, 45 beam, and 7 feet depth, keel to be laid October 1.

Manitowoc Steamship Corporation, Manitowoc, Wisconsin, has an order for two car ferries for the Grand Trunk-Milwaukee Car Ferry Co., to be 360 feet over-all, 58 feet molded beam, and 21 feet 6 inches depth. The ferries will each be powered with two triple expansion engines, steam to be supplied by four Scotch boilers.

M. M. Davis & Son, Solomon's, Maryland, has an order for a yacht for Robert D. Roebling of Washington, D. C. The yacht will be 90 feet long powered with diesel engine.

Southern Shipyard Corporation, Newport News, has a contract from the United States Lighthouse Service for a lighthouse tender to be called the Beech. The boat will be 101 feet over-all, 21 feet molded beam, 5 feet 6 inches draft. She will be powered with steam engines.

American Brown-Boveri Electric Corporation, Camden, New Jersey, has an order from the Reading Company for four single-deck steel lighters, dimensions 110 feet by 32 feet, by 9 feet 6 inches.

W. G. Abbott, Milford, Delaware, has an order for an oil tank launch, 64 feet 10 inches long, 15 feet 6 inches beam, and 7 feet 2 inches depth, for the Standard Oil Company (N.Y.). She will have a capacity of 10,000 gallons and will be powered by a 75-horsepower Standard diesel engine.

Midland Shipbuilding Co., Midland, Ontario, has a contract from the Canadian Steamship Lines, Ltd., for two freighters to be similar to the steamships City of Toronto and City of Kingston.

KEEL LAYINGS

Yacht for Frank B. Drake by W. F. Stone & Son, Oakland, Aug. 25.

Bulk freighter for Pickands, Mather & Co., by American Ship Building Co., Cleveland, July 19; sister ship, Aug. 9.

Two barges for U. S. Engineers, Savannah, by Bethlehem Shipbuilding Corp., Harlan Plant, Wilmington, Aug. 9; carfloat for Southern Railway Co., Aug. 23.

Steel carfloat for Pennsylvania Railroad by Wm. Cramp & Sons Ship and Engine Building Co., Aug. 17.

Dredge hull by Nashville Bridge Co., Aug. 10.

WM. CORNFOOT, President GEO. RODGERS, Sec'y-Treas.
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Northland, coast guard cutter for U.S. Government, by Newport News Shipbuilding & Drydock Co., Aug. 16.

Hydraulic dredge for American Dredging Co., by Sun Shipbuilding Co., Chester, Pa., Aug. 10; stern-wheel towboat for International Petroleum Co., Aug. 30.

Stern-wheel diesel towboat for stock by The Charles Ward Engineering Works, Aug. 25; two steel barges for W. C. Kelly Barge Line, Aug. 12 and 24.

LAUNCHINGS.

Carfloat for Western Maryland Railroad by Bethlehem Shipbuilding Corp., Baltimore, Sept. 7.

Lighter by Charleston Dry Dock & Machinery Co., Aug. 19.

Oil barge for Sun Oil Co., by Sun Shipbuilding Co., Chester, Pa., Sept. 7.

DELIVERIES.

Margnita, combination steamer for Coastwise Transportation Co., Juneau, by J. C. Johnson's Shipyard, Port Blakely, Wn., Sept. 1; two scows to American Tug Boat Co., Everett, Aug. 25.

Steel carfloat to Atchison, Topeka & Santa Fe R.R., San Francisco, by the Moore Dry Dock Co., Oakland, Aug. 6.

Two fueling scows to the Barrett Line by American Bridge Co., Pittsburgh, Aug. 21.

Suction dredge to U. S. Engineers by American Brown-Boveri Electric Corp., Camden, August.

Fisher's Island, passenger and auto ferryboat for Fisher's Island Navigation Co., by Bethlehem Shipbuilding Corp., Aug. 25.

Steel Chemist, freighter for U. S. Steel Corp. by Federal Shipbuilding & Drydock Co., Aug. 28.

Geo. W. Miller, steam ferryboat for Vicksburg & Delta Ferry Co., Vicksburg, Miss., by Howard Shipyards & Dock Co., Jeffersonville, Ind., Aug. 18; two K.D. barges for Bahman Iron Works, Cincinnati, for shipment to South America, Aug. 31.

Fairfax, combination passenger and freight steamer for Merchants & Miners Transportation Co., Baltimore, by Newport News Shipbuilding & Drydock Co., Newport News, Sept. 4; Arcadia, diesel yacht to Galen L. Stone, Sept. 1; Robador, diesel engine yacht to Robert Law, Jr., Aug. 17.

Two steel barges to the Kelly Axe and Tool Co., by the Chas. Ward Engineering Works, Aug. 25.

REPAIR AWARDS.

The Moore Dry Dock Company, Oakland, California, has received a contract from the Union Oil Company of California for repairs to the tanker La Placentia, which was damaged in collision with the freighter Eagle off the Golden Gate. The cost of repairs will be $34,548.

Hanlon Dry Dock and Shipbuilding Co., Oakland, California, has an order from Stanley Hiller for the installation of fish oil tanks on the steamer Lake Miraflores, recently purchased from the Shipping Board. The award was made on a low bid of $18,656.

Survey is being made of the wrecked steamer Kaiku Maru to ascertain extent of damage. The steamer went ashore near Victoria recently and salvage crews are lightering her lumber cargo. The Kaiku is ashore from stern to amidships and her decks are on a level with the sea.

Bethlehem Shipbuilding Corporation, Union Plant, San Francisco, has completed repairs to the Standard Oil tanker Paul Shoup, which was damaged while on dry-dock for general overhaul. The work of rebuilding cost in the neighborhood of $175,000. This yard during September experienced one of the busiest months of the year in general repair and overhaul of coastwise and intercoastal vessels.

SHIPYARD NOTES

We have received the twenty-seventh annual report of the American Ship Building Company of Cleveland for the fiscal year ended June 30, 1926. According to President A. G. Smith, the profit from new ship construction and ship repair business done during the year slightly exceeded that derived from similar work in the previous year. The construction of two bulk freight steamers was completed. Contracts have been signed since June 30 for the construction of five additional bulk freighters, which will be completed during the current fiscal year. On June 1, 1926, the land, buildings, and other fixed property of the company at Wyandotte, Michigan, were sold. The present activity in ship operation on the Great Lakes promises a fair volume of ship repair business for the coming winter. The financial statement of the American Ship Building Company shows a net profit of $1,150,121.94.

Effective September 1, the Emergency Fleet Corporation, Department of Maintenance and Repair, headed by Captain R. D. Gatewood, increased its supervision over the repairs performed on Shipping Board vessels in the hands of its operators. Following is an outline of routine which must be followed by operators when repairs are needed:

1. Determining the necessity for the work.
2. Including all possible work in the original contract, thus avoiding extras.

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3. Authorizing no work that should properly be performed by the crew.

4. Seeing that the maximum competition is obtained and award is regular.

5. Inspecting during progress of the work, so that the maintenance and repair representative will be in a position to certify as to the completion of the work in a satisfactory manner.

The maintenance and repair representative in each port has authority to approve repairs without first securing the approval of the home office of the division when competitive bids do not exceed $3000 and also has similar authority on lump sums to $500.

Harbor Boat Builders, Ltd., Vancouver, have been incorporated in British Columbia with authorized capital of $20,000 to build or otherwise acquire ships, etc., to operate steamships and generally carry on the business of shipbuilder and ship repairer and to enter into contracts for the carriage of mails, passengers, and goods.

Deep Seas Freighters, Ltd., Vancouver, has been incorporated in British Columbia for $50,000 to carry on the business of shipowner, wharfinger, ship chartering, etc.

The Western Boat Building Company, Tacoma, Washington, recently completed a freight boat, the Seatac, for Puget Sound service of the Merchants' Transportation Co. The boat is 115 feet 6 inches over-all, 32 feet 7 inches beam, and 10 feet 5 inches depth of hold. She is of sturdy wooden construction and powered with a 180-horsepower, direct-reversible, Fairbanks-Morse diesel engine. The vessel is equipped with a Barlow marine elevator. Two Hill full diesel engines of 30 and 10 horsepower, respectively, furnish power for electric lighting and air compressor. A. M. Hunt & Son, Tacoma, installed the auxiliary machinery.

The new fitting out pier at the United States Navy Yard, Bremerton, Washington, was dedicated on August 27. The pier was accepted by Captain Walter Hinds Allen, public works manager. It is the largest of its kind owned and operated by the Navy. It is 1318 feet long, 100 feet wide, and is equipped with three standard gauge railway tracks, and two 22-foot gauge tracks. A giant electric crane, 245 feet high with a capacity of 350 tons, is to be erected on the outward end of the pier. The pier will accommodate four superdreadnaughts at one time.

The Ballard Marine Railway Company, Salmon Bay, Seattle, recently completed a new tug, the Malolo, for Captain E. F. Dunlap. The boat was designed by L. H. Coolidge, of Seattle. She is 53 feet 6 inches long, 13 feet 6 inches beam, and is powered with Fairbanks-Morse diesel engine of 60 horsepower.

First five midship frames set in place for new 140-foot yacht building at the yard of W. F. Stone & Son, Oakland, California, for John Borden of Chicago.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Associates, hull 5330, diesel tank barge for Associated Oil Company; 160 L.B.P.; 38 breadth; 9'6" molded depth; 7' molded draft; 4000 bbls. oil capacity; Union diesel engs.; keel June 15/26.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

Margnita, hull 74, mail, freight, and passenger boat for Coastwise Transportation Co., Juneau, Alaska; 90 L.B.P.; 22 beam; 15'6" draft; 200 H.P. diesel engs. Keel Apr. 24/26; launched Aug. 4/26; **delivered Sept. 1/26.**

A. T. B. Co. No. 27, Hull 81, scow, for American Tug Boat Co., Everett, Wash.; 100x36'x 8'8"; keel Aug. 3/26; **delivered Aug. 25/26.**

A. T. B. Co. No. 28, Hull 82, scow; keel Aug. 12/26; **delivered Aug. 25/26.**

Reed No. 3, hull 83, scow for Reed Mill Co., Shelton Wn.; 95'x33'x8'5".

Reed No. 4, same as above.

Reed No. 5, same as above.

THE MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

No name, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; keel May 3/26; launch Oct. 1/26 est.; deliver Dec. 1/26 est.

No name, hull 171, sister to above; keel May 3/26; launch Oct. 15/26 est.; deliver Dec. 15/26 est

Hull 169, steel carfloat for Atchison, Topeka & Santa Fe R.R.; 260' long; 38' beam; 7'8" loaded draft; 620 D.W.T.; keel Apr. 1/26; launched June 29/26; **delivered Aug. 6/26.**

PRINCE RUPERT DRYDOCK AND SHIPYARDS

Prince Rupert, B.C.

One launch for British Columbia Forestry Dept., 40' long, Skandia eng.

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

Not named, hull 823, passenger boat for Capt. Fred Lewis; 50 L.B.P.; 14 beam; 3' 6" loaded draft; 10 mi. speed; 50 I.H.P. gas eng.; deliver Oct. 1/26 est.

Not named, hull 824, yacht for John Borden; 140 L.B.P.; 30 beam; 14 loaded draft; 10 mi. speed; 360 I.H.P. diesel engs.; keel Sept. 1/26 est.; deliver May 1/27 est.

Not named, hull 828, yacht for Frank B. Drake; 55 L.B.P.; 13 beam; 6 loaded draft; 7 mi. speed; 30 I.H.P. gas eng.; **keel Aug. 25/26;** deliver May 1/27 est.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 149' 2" x 33' 4"x5' 10-5/16".

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 170'x38'10"x6' 1¾; 1 delivered July 29/26.

Six steel barges for The Barrett Line, Cincinnati, 225'x40'x9'; **delivered Aug. 21/26.**

Two fueling scows for The Barrett Line, 100'x18' x8'; **delivered Aug. 21/26.**

Twenty (20) steel coal barges for Hillman Transportation Co.; 175x26x11 ft.; **10 delivered.**

Ten steel coal barges for Hillman Trans. Co., 175x26x11 ft.

Six barges covered for Carnegie Steel Co., 175x26 x11 ft.

Five coal barges for Wheeling Steel Corp.; 140'x 26'x10'; deliver Nov./26 est.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

Hull 314, suction dredge for U.S. Engineers; 130' R.R.; 366' long; 2 tracks; platform; keel Apr./26; **launched and delivered Aug./26.**

Hull 319, steel motor patrol boat for U.S. Coast Guard, Washington, D.C.; 125 L.O.A.; 23'6" molded beam; 220 tons displacement; Winton diesel engs.; keel July/26.

Hull 320; same as above; keel July/26.
Hull 321, same as above; keel July/26.
Hull 322, same as above; keel July/26.
Hull 323, same as above; keel July/26.
Hull 324, same as above; keel July/26.
Hull 325, same as above.
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Hull 350, same as above.
Hull 351, same as above.

Hull 352, diesel-electric vehicular ferryboat for Electric Ferries, Inc., New York; 155 L.O.A.; 48'6" beam; 14'3" depth; keel June/26; launch early fall 1926.

Hull 353, same as above; keel June/26; launch early fall 1926.

Hull 354, same as above; keel June/26; launch early fall 1926.

Hull 355, same as above; keel June/26; launch fall 1926.

Hull 357, same as above; keel June /26; launch fall 1926.

Hull 358, same as above; keel June/26; launch fall 1926.

THE AMERICAN SHIP BUILDING COMPANY

Cleveland, Ohio.

Purchasing Agent: C. H. Hirsching.

No name, hull 793, bulk freighter for Pickands, Mather & Co.; 580 L.B.P.; 60 beam; 20 loaded draft; 13 mi. loaded speed; 12,000 D.W.T.; T.E. engs.; 2400 I.H.P.; 3 B. & W. boilers 200 lbs. pressure; **keel July 19, 1926.**

No name, hull 794, sister to above; **keel Aug. 9/26.**

No name, hull 795, bulk freighter for Inland Steel Co.; 596 L.B.P.; 64 beam; 20 loaded draft; 13 mi. speed; 13,500 D.W.T.; T.E. engs.; 2700 I.H.P.; 3 Scotch boilers, 14′6″x11′x185 lbs.

No name, hull 796, bulk freight steamer for Kinsman Transit; 580 feet L.B.P.; 60 feet beam; 20 loaded draft; 13 mi. speed; 12,000 D.W.T.; triple expansion engs.; 2500 I.H.P.; 3 Scotch boilers, 14x11; 195 lbs. pressure.

No name, hull 797, self-unloading bulk freighter for Bradley Transportation Co.; 615 L.B.P.; 65 beam; 20 loaded draft; 14 mi. speed; 13,000 D.W.T.; turbo-electric drive; 4000 I.H.P.; 2 water tube boilers; 380 lbs. pressure.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT

Quincy, Mass.

Lexington, hull 1300, airplane-carrier U.S.N., launched Oct. 3/25.

No name, hull 1398, ferryboat for City of Boston, 172 L.B.P.; 40-8 beam; 10-4½ draft; 2 Comp. engs. 860 I.H.P.; 2 Scotch boilers; 10′ dia. 13′ long; keel Apr. 13/26.

No name, hull 1399, sister to above; keel Apr. 13/26.

Hull 1401, ferryboat for Jamestown & Newport Ferryboat Co.; 126 L.B.P.; 48 beam; 14 depth; 700 gro. tons.

Hull 1402, carfloat, N.Y., N.H. & Hartford R.R.; 360′x40′x11′6″; 1375 gro. tons; keel July 14/26.

Hull 1403, carfloat, same as above; keel July 15/26.

Hull 1404, carfloat, same as above.

Hull 1405, carfloat, same as above.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT

Wilmington, Del.

Fisher's Island, hull 3504, passenger and auto ferryboat for Fisher's Island Navigation Co.; 150′ L.B.P.; 40′ beam; 15′ 6″ depth; Scotch boilers; single screw; 800 H.P.; keel May 19/26; launched Aug. 13/26; **delivered Aug. 25/26.**

No. 20, hull 3505, carfloat for Long Island R.R. Co.; 290 L.B.P.; 42 beams; 11′ 6″ loaded draft; 1200 gross tons; keel Apr. 15/26;

No. 21, hull 3506, carfloat same as above; keel May 1/26.

Hull 3507, barge for U.S. Engineers, Savannah, Ga., 60 L.B.P., 22 beam; 4 loaded draft; 44 gross tons; keel June 21/26; launched July 21/26.

Hull 3508, barge same as above; **keel Aug. 9/26.**

Hull 3509, barge same as above; **keel Aug. 9/26.**

Hull 3510, carfloat, So. Ry. Co.; 195′x33′x9′; 480 gro. tons.; **keel Aug. 23/26.**

Oil barge for Seaboard Shipping Corp.; 170′x37′x12′6″.

BETHLEHEM SHIPBUILDING CORP., BALTIMORE DRY DOCK

Baltimore, Md.

Hull 6134, carfloat for So. Ry. Co., 145′x33′x10′; 492 gro. tons.

Hull 6135, carfloat for Western Maryland R. R., 190′x35′x9′; 400 gr. tons; keel May 20/26; **launched Sept. 7/26.**

Hull 6136, carfloat for Western Maryland R. R.

CHARLESTON DRY DOCK AND MACHINERY COMPANY

Charleston, S. C.

Purchasing Agent: Charles R. Valk.

Charleston, 12-inch suction dredge for Sanford Brook, steam eng.; 1 Scotch boiler; keel Oct. 23/25.

Lighter, 100′x30′x8′; **launched Aug. 19/26.**

Lighter, 80′x26′x7; keel Aug. 6/26.

CONSOLIDATED SHIPBUILDING CORPORATION

Morris Heights, N. Y.

Saga, hull 2824, cruiser, Hugh Cresswell, 68′x12′; Sterling engs.

Vasanta, hull 2826, cruiser, G. M. Pynchon, 92′x16′; 2-300 H.P. Speedway engs.

Rainbow III., hull 2827, cruiser, .R P. Joy; 62′x12′; 2-180 H.P. Speedway engs.

Zinzance II., hull 2828, cruiser, E. S. Moore; 81′x14′ 6″; 2-500 H.P. Wright Typhoon engs.

Lura M. II., hull 2836, cruiser, W. A. Fisher; 80′x14′; 2 Winton engs.

Signal II., hull 2837, cruiser, W. M. Chesebrough, 48′x12′; 1 MR6-180 H.P. Speedway eng.

Hull 2840, cruiser, H. Darlington, 81′x14′6″; 2-500 H.P. Wright Typhoon engs.

Robaliss III., hull 2841, cruiser, R. L. Corby; 73′x12′6″; 2-300 H.P. Speedway engs.

Evening Star, hull 2842, cruiser, H. H. Demmert; 71′x13′; 2 MR-6-180 H.P. Speedway engs.

Avalanche III., hull 2843, cruiser, Anson Hard; 100′x16′; 2-300 H.P. Speedway engs.

Carminita II., hull 2844, cruiser, G. E. Halliday; 60′x13′; 1-115 H.P. Speedway eng.

Marinette II., hull 2846, cruiser, E C. Romph; 74′x15′; 2-300 H.P. Speedway eng.

Kegonsa, hull 2847, cruiser, G. Dahl; 81′x14′; 2-500 H.P. Wright Typhoon engs.

Hull 2859, cruiser, Dr. J. A. Vietor; 82′x14′6″; 2-300 H.P. Speedway engs.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO.

Philadelphia, Pa.

Purchasing Agent: Ed. C. Geehr.

Malolo, hull 509, express psgr and frt liner, Matson Navigation Co.; 582 LOA; 577 length at water line; 83 ft beam; depth molded to C deck 54 ft; displacement 22,050 tons; 8250 DWT; speed 22 knots regular, 23 knots maximum; 25,000 shaft horsepower; Cramp-Parsons turbines; oil burning B & W water-tube boilers; keel May 4/25; launched June 26/26; deliver May 1/27 est.

Yarmouth, hull 518, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55-6 beam; 29-6 molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears, six single-ended Scotch boilers; keel Feb. 23/26; launch Oct. 1/26 est.

Evangeline, hull 524, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55′6″ beam; 29′6″ molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears; 6 single-ended Scotch boilers; keel May 1/26; launch Dec. 1/26 est.

Hull 527, steel carfloat for Pennsylvania R.R.; 250′ molded length; 34′ molded breadth; 9′ molded depth; keel June 4/26; launch Sept./26 est.

Hull 528, same as above; keel June 28/26; launch Nov./26 est.

Hull 529, same as above; keel July 28/26; launch Nov./26 est.

Hull 530, same as above; **keel Aug. 17/26;** launch Nov./26 est.

Salt Lake City, hull 531, light cruiser for United States Navy; 10,000 tons displacement; keel Apr./27 est.

DEFOE BOAT & MOTOR WORKS

Bay City, Mich.

Purchasing Agent: G. O. Williams.

Hull No. 85, steel vessel U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 210 DWT; 300 IHP, diesel engs; keel April/25; launched April 2/26; deliver April 15/26 est.

Hull No. 86, sister to above; keel Apr10/25; launch April 15/26, est.; deliver April 15/26, est.

Hull No. 87, sister to above; keel Apr18/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 88, sister to above; keel May 5/25; launch Apr. 11/26, est, deliver April 15/26, est.

Hull No. 89, sister to above; keel June15/25; launch April 11/26, est; deliver Apr. 15/26, est.

Hull 90, steel patrol boat for U. S. Coast Guard; 98 LBP; 23 beam; 7 loaded draft; 12 mi speed; 210 DWT; 300 IHP diesel engs; keel Nov. 1/25; deliver April 15/26, est.

Hull 91; sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Hull 92, sister to above; keel Nov. 1/25; launch Apr. 1/26, est; deliver Apr. 15/26, est.

Sylvia, hull 93, steel yacht, Logan G. Thomson; 133 LBP; 21-6 beam; 7-6 loaded draft; 14 mi speed; 600 IHP twin Bessmer diesel engs.; keel Nov. 15/25; launch Mav 1/26 est.; deliver May 15/26 est.

Lassie, hull 95, wooden yacht for T. B. Van Dorn, Cleveland, same as above; keel Jan. 1/26; launch May 1/26, est.; deliver May 15/26, est.

No name, hull 96, wooden yacht for Hacker & Ferman, Detroit; same as above; keel Jan. 1/26; launch May 1/26, est; deliver May 15/26, est.

Bo Peep II., hull 111, wood yacht, for I. M. Kirlin of Detroit; 55 L.B.P.; 13 beam; 3′ 9″ draft; 13 mi. speed; 13 D.W.T.; 140 H.P. gas engs.; keel Jan. 15/26; launch May 1/26 est.; deliver June 1/26 est.

No name, hull 112, wood yacht for Alex McLeod of Detroit, same as above; keel Feb. 1/26; launch May 1/26 est.; deliver June 15/26 est

No name, hull 118, wood yacht for John J. Barlum of Detroit; 65 LBP; 12′ 6″ beam; 3′ 6″ draft; 28 mi. speed; 15 D.W.T.; 600 H.P. gas engs.; keel Jan. 18/26; launch May 15-26 est.

No name, hull 119, wooden yacht for Contgomery Whaling, Detroit; 44′ L.B.P.; 10′6″ beam; 2′11″ loaded draft; 22 mi. speed; 10 DWT.; 200 H.P. gas engs.; keel Feb. 1/26; launch May 1/26 est.; delivery June 1/26 est.

No name, hull 120, wood yacht for W. C. Rands, Detroit; 83′ L.B.P.; 15′ beam; 3′6″ loaded draft; 35 mi. speed; 60 D.W.T.; 1200 I.H.P. gas engs.; keel Mar. 10/26; launch June 1/26 est.; deliver June 15/26 est.

DRAVO CONTRACTING COMPANY

Pittsburgh, Pa.

Wakerobin, hull 453, lighthouse tender for Bureau of Lighthouses, 153-6 long, 43 beam; 6-6 depth; 900 gro. tons.

Hulls 494-502 inc., 9 steel barges for stock; 230x45x11 ft.; 650. gro tons ea.

Hulls 434-438 inc. and 503; 6 steel barges for Keystone Sand & Supply Co.; 135′ x 27′ x 6′; 320 gro. tons ea.

Hulls 509-510, 2 steel barges, Pittsburgh Plate Glass Co.; 125′x26′x10′; 330 gro. tons ea.

Hulls 511-530 inc. 20 steel barges for U.S. Engineers, St. Louis, Mo.; 55′x16′x3′; 26 gro. tons each.

Hull 531, 1 diesel engine towboat, Wheeling Steel Corp., Wheeling, W. Va.; 110′x26′x5′; 215 gro. tons.

Hulls 532 and 533, two steel barges, for stock, 55x16x3ft.

Hull 534, 1 ladder type sand and gravel dredge for Pittsburgh Plate Glass Co.; 155x44x8ft., 430 gross tons.

Hulls 535-538 inc., four steel whirler boat hulls for Contracting Dept.; 40x48x5′6″; 100 gro. tons.

Hull 539, 1 diesel engined towboat for Labelle Transportation Co., 110′x26′x5′; 215 gro. tons.

Hulls 544-550 inc., 7 pile driver hulls for U.S. Engineers, St. Louis; 88′x25′x4′; 100 gro. tons ea.

Hulls 540-543 inc.; 4 steel barges for Keystone Sand & Supply Co.; 135′x27′x8′; 320 gro. tons ea.

Hulls 551-552, two pile driver hulls for Fruin-Colnon Contracting Co., St. Louis; 88′x25′x4′; 100 gro. tons ea.

Hull 553-566 inc., 14 steel barges for Mississippi River Commission, Memphis; 120′x30′x7′4″; 430 gro. tons ea

DUBUQUE BOAT & BOILER WORKS

Dubuque, Iowa

Purchasing Agent: A. L. Yehger.

Two steel dump scows for U.S. Engineers, Louisville, Ky.

Thorpe, river towboat for Upper Mississippi Barge Line Co. & Inland Waterways Corp.; 132′x35′x3′6″; stern wheel, tandem comp. surface condensing engs.; 15″x30″x78″ stroke; keel Oct. 1/26 est.; launch Mar. 1/27 est.; deliver Apr. 1/27 est.

Weber, river towboat, sister to above; keel Oct. 1/26 est.; launch Mar. 1/27 est.; deliver Apr. 1/27 est.

Morse, river towboat, sister to above; keel Oct. 1/26 est; launch Mar. 1/27 est; deliver Apr. 1/27 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent: R. S. Page.

Steel Chemist, hull 83, freighter, U. S. Steel Corp.; 250 LBP; 42 ft 9 in beam; 20 loaded draft; 2100 DWT; Worthington engs. 950 SHP; keel Sept. 15/26; launched May 5/26; **delivered Aug. 28/26.**

Willets Point, hull 85, seagoing, diesel-electric hopper dredge for U. S. Army Engineers; 193 ft LBP; 41 beam; 19 ft 6 in depth molded; two Winton diesel engines; keel Dec. 16/25; launched June 26/26; deliver Sept. 10/26 est.

Gulfpride, hull 86, tanker for Gulf Refining Co.; 525′ L.B.P.; 74′ beam; 28′ loaded draft; 11 knots speed; 17,400 D.W.T.; 4500 I.H.P. diesel engs.; keel June 15/26; launched June 15/26.

No name, hull 89, passenger and freight steamer for Southern Pacific Steamship Lines, Pier 49, North River, New York; 427 L.B.P.; 60 beam; 25′6″ loaded draft; 6700 D.W.T.; De Laval steam turbines; 7700 S.H.P.; 4 B. & W. boilers, 21,900 sq. ft. heating surface; 16,000 sq. ft. superheating surface.

HOWARD SHIPYARDS & DOCK COMPANY

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

No name, hull 1590, diesel-electric side-wheel excursion boat for stock; 250x40x7 ft.; 15 mi. speed; 2400 HP diesel engs.

Geo. W. Miller, hull 1591, steam ferryboat for Vicksburg & Delta Ferry Co., Vicksburg, Miss.; 140′ L.B.P.; 32′ beam; 6′ deep; 3′ loaded draft; 10 mi. speed; abt. 250 D.W.T.; straight, high pr. engs, 12′x6′; 2 fire tube boilers; 44″x22′; keel Apr. 13/26; launched July 3/26; **delivered Aug. 18/26.**

Patricia Barrett, hull 1592, steam towboat for Barrett Line, Cincinnati; 125′ L.B.P.; 40′ beam; 6′ deep; 4′ loaded draft; comp. engs. 18″x32″x6′; 4 Scotch boilers, 44″x22′; keel June 23/26; launch Sept. 15/26 est; deliver Oct. 15/26 est.

Hull 1593, steel hull for stmr. Mississippi of Mississippi River Com., St. Louis, Mo.; keel Sept. 25/26 est.

Hull 1594, one K.D. barge for Bahman Iron Works, Cincinnati, for shipment to South America for assembly; 85 L.B.P.; 17 beam; 4′ depth; 18″ light draft; **keel Aug. 2/26; delivered Aug. 31/26.**

Hull 1595, K.D., barge, sister to above; keel Aug. 20/26; **keel Aug. 16/26; delivered Aug. 31/26.**

Hull 1596, concrete mixer hull for Mississippi River Commission, St. Louis, Mo.; 120 L.B.P.; 45 beam; 7′ depth; keel Oct. 1/26 est.

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wis.

Purchasing Agent: H. Meyer.

No name, hull 222, double-end car ferry, Wabash Railroad; 370 L. O. A.; 65 beam, 21 ft 6 in depth; two screws at each end; 4 comp. engs. of 1000 HP each; 6 Scotch marine boilers; keel Nov. 30/25; deliver March 20/26 est.

Hull 226, one car ferry for Grand Trunk Milwaukee Car Ferry Co.; 360' L.O.A.; 58' molded beam, 21'6" depth; 2 T.E. engs.; 4 Scotch boilers.

Hull 227, car ferry, sister to above.

MIDLAND BARGE COMPANY

Midland, Pa.

Purchasing Agent: H. S. Neal.

Contract 1052, 12 steel deck flat scows, 75'x25' x5' 6"; for State of New York, dept. of public works, Bureau of Canals; 9 launched and delivered.

One tunnel boat for General Development Co.; 82' long.

One hull for Dillman Egg Case Co., 70x30x40 ft.; keel Sept. 30/26 est.

One barge for Southern Cotton Oil Co., 100x35 x7 ft.

. Fifteen barges for Inland Waterways Corporation, 126'x33'x7'6".

MIDLAND SHIPBUILDING COMPANY, LTD.

Midland, Ontario

Purchasing Agent: R. S. McLaughlin.

Glenmohr, hull 16, single deck freighter for Great Lakes Transportation Co., Ltd., Midland, Ontario; 633 L. O. A.; 70 beam; 29 depth; 11 knots speed; 18 ft. loaded draft; 15,000 D.W.T.; TE engs. 30000 H.P.; keel Nov. 18/25; launched June 23/26; deliver Aug 12/26 est.

NASHVILLE BRIDGE COMPANY

Nashville, Tenn.

Purchasing Agent: Leo E. Wege.

Hull 107, dredge hull, 124 L.B.P.; 30 beam; 8 draft.; keel Aug. 10/26.

Hull 108, dredge, 110'x51'6"x8'; keel Sept. 15/26 est.

Hull 110, deck barge for stock; 100 L.B.P.; 24 beam; 5 loaded draft; keel Aug. 2/26; launched and delivered Sept. 10/26.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas: Plummer, 233 Broadway New York City.

Fairfax, hull 290, combination passenger and freight steamer, Merchants & Miners Transportion Co., Baltimore, Md.; 350 length; 52 beam; 36 depth; 13½ mi speed; TE eng; 4 Scotch oil-fired boilers; keel Nov. 12/25; launched June 12/25; launched June 12/26; delivered Sept. 4/26.

Raymond, Hull 292, diesel electric, 20-in. pipe line dredge, U. S. Engineers, Philadelphia, 230 ft. long; 40 ft. beam; 14 ft. depth; McIntosh & Seymour diesel engs.; keel Nov. 19/25; launched Mar. 20/26; deliver Sept./26 est.

Savarona, hull 303, diesel yacht, 2 screws for R. M. Cadwalader; 174 L.O.A.; 27 beam; 15 ft. 8 in. depth; Winton engs.; keel Jan. 16/26; launched Mar 20/26; deliver Oct./26 est.

Arcadia, hull 304, diesel yacht, 2 screw, for Galen L. Stone; 177 L.O.A.; 27 ft 6 in beam; 15 ft. 8 in. depth; Winton engs.; keel Feb. 11/26; launched Apr. 3/26; delivered Sept. 1/26.

Iroquois, hull 306, passenger and freight steamship for Clyde Steamship Company, New York, 407'-3" overall, 62'-0" beam, 30'-6" depth, Newport News turbines and gear; 8500 I.H.P.; Scocth boilers; oil burning; keel March 20/26; launch Dec. /26 est.

Shawnee, hull 307, sister to above; keel May 15/26; launch Jan./27 est.

No name, hull 315, 18-knot, passenger liner for Panama Pacific Line, New York; 600 ft. long, 80 ft. beam, 52 ft. depth; watertube boilers for oil 22,000 gross tons; 17,000 I.H.P.; keel Mar. 20/26; launch Feb./27 est.

Robador, hull 316, diesel engine yacht, for Robert Law, Jr., 160'-6" long, 26'-0" beam, 14'-9" depth; keel Apr. 5/26; launched May 29/26; delivered Aug. 17/26.

Algonquin, hull 317, passenger and freight steamship for Clyde Steamship Co., New York, 402'-0" overall, 55'"-0" beam, 31'-6" depth; Newport News turbines and gears; Scotch boilers for oil burning; keel March 23/26; launch Sept. 9/26 est.; deliver Dec /26 est.

Northland, hull 318, coast guard cutter for U. S. Government; 216' long; 39' beam; 24'9" draft; diesel-electric propulsion; McIntosh & Seymour engs.; keel Aug. 16/26.

No name, hull 319, passenger and freight steamer for Red D Line, New York; 335'4" L.O.A.; 51' beam; 22' draft; Newport News turbines and gears; water-tube boilers; 3560 D.W.T.; 4000 S.H.P.

THE PUSEY & JONES CO.

Wilmington, Del.

Purchasing Agent: James Bradford.

John Cadwalader, hull 1030, single screw pass.-freight steamer for Baltimore & Philadelphia Steamboat Co., Philadelphia; 219 L.B.P.; 45 beam; 11 loaded draft; 14½ mi speed; 4 crank, TE engs. 21-32-35-35 by 24"; two B. & W. water-tube boilers, 3046 sq. ft. heating surface each; keel Nov. 11/25; launched March 27/26; deliver Sept. 15/26, est.

No name, hull 1031, sister to above.

Not named, hull 1033, steel single screw day steamer for Hudson River Day Line, New York; 252 L.B.P.; 46 beam; 4-cycle, triple expansion engs.; 2800 I.H.P.; 4 B. & W. water-tube boilers; 11x12 200 lbs. pressure; keel Sept. 15/26 est.

SPEDDEN SHIPBUILDING CO.,

Baltimore, Md.

Purchasing Agent: W. J. Collison.

Samson, hull 262, steel hull towboat, G. F. Pettinos, Philadelphia; 87' LOA x 21' beamx11'6" draft; 400 H.P. Ingersoll-Rand diesel engs.; keel March 15/26; launch Aug. 23/26 est.; deliver Sept. 23/26 est.

STATEN ISLAND SHIPBUILDING COMPANY

Staten Island, N. Y.

Purchasing agent: R. C. Miller.

American Legion, hull 764, ferryboat for City of New York, 264 L.O.A.; 66 beam over-all, 47 beam mld.; 14 loaded draft; 15 mi. speed; abt. 2600 gro. tons; 2 comp. engines, 3500 I.H.P.; 4 W.T. boilers; keel Feb. 8/26; launch Sept. 29/26 est.

No. 33, hull 765 tugboat hull for New York Cenral R.R.; 96'x26'x10'-3"; 12 knots speed; 200 gr. tons; 650 I.H.P. diesel-electric prop. unit; keel Mar. 29/26; deliver Aug. 26/26, est.

No. 34, hull 766; tugboat, sister to above; keel Apr. 8/26; deliver Sept./26 est.

Meitowax, hull 768, tugboat for Long Island Railroad Co.; 108' L.O.A.; 26' beam; 13'2" molded depth; diesel-electric propulsion; keel June 16/26; deliver Oct./26 est.

Hull 769, grain elevator for International Elevating Co.; 130 L.O.A.; 35 beam; 9 loaded draft forward; 11 loaded draft aft; diesel engs.; deliver Jan./27 est.

SUN SHIPBUILDING COMPANY

Chester, Penn.

Purchasing Agent: H. W. Scott.

Hull 96, barge for Sun Oil Co. 158-x24-4-x11-3, 150,000 gals. cap.; 150 B.H.P.; keel May 26/26; launched Sept. 7/26; deliver Sept. 15/26 est.

Hull 98, hydraulic dredge for American Dredging Co.; 110x31'10"x10'; keel Aug. 10/26; deliver Nov./26 est.

Hull 99, stern-wheel towboat for International Petroleum Co.; 160'x44'x5'; 3'3" draft; 750 I.H.P. engs.; keel Aug. 30/26; deliver Dec./26 est.

Hull 100, one oil barge for Proctor & Gamble, 150'x40'x13'; 1200 tons capacity.

TODD ENGINEERING, DRYDOCK & REPAIR CORP.

Brooklyn, N. Y.

Purchasing Agent: H. J. Shannon.

Sumar, hull 37, steel twin-screw diesel motor yacht for David C. Whitney; 151' LBP; 26' beam; 12' loaded draft; 2 Bessemer diesel engs. 420 S.H.P. each; keel Jan. 19/26; launched April 14/26; deliver Aug. 15/26 est.

Sivad, hull 39, steel twin-screw diesel motor yacht for S. P. Davis; 162' 10" L.B.P.; 27' 4" beam, 13' loaded draft; 14 mi. speed; 2 Bessemer diesel engs.; 800 S.H.P. ea.; keel March 25/26; launched May 25/26; deliver Sept. 1/26 est.

THE CHARLES WARD ENGINEERING WORKS

Charleston, W. Va.

Purchasing Agent: E. T. Jones.

No name, hull 46, steel barge, Kelly Axe and Tool Co.; 150 long, 26 beam; 8 deep; keel Mar. 14/26; launched July 20/26; delivered Aug. 25/26.

No name, hull 47, sister to above; keel June 1/26; launched July 27/26; delivered Aug. 25/26.

No name, hull 49, stern-wheel diesel towboat, for stock; 180 HP diesel engs.; keel Aug. 2/26; deliver Oct. 1/26 est.

Hull 50, steel barge for stock; 150x26x8ft.; keel July 27/26; launched Sept. 2/26.

Hull 51, steel barge for W. C. Kelly Barge Line; keel Aug. 12/26.

Hull 52, same as above; keel Aug. 24/26.

Hull 53, same as above.

Hull 54, same as above.

Hull 55, same as above.

Hull 56, same as above.

Hull 57, same as above.

Hull 58, same as above.

Hull 59, same as above.

W. A. Shepard, hull 60, towboat for W. C. Kelly Barge Line; Fairbanks-Morse diesel engs.

Duncan Bruce, hull 61, stern-wheel towboat, for W. C. Kelly Barge Line; Fairbanks-Morse diesel engs.

Repairs

BETHLEHEM SHIPBUILDING CORP., LIMITED

Union Plant

Drydock, paint, misc. repairs: Californian, K. R. Kingsbury, Esther Johnson, A. H. Payson, R. J. Hanna, West Cactus, Lubrico, Melville Dollar, D. G. Scofield, Water Nymph, Eagle, Nevada, Johan Poulsen, H. T. Harper, Montanan, Labrea, Childar, Ernest H. Meyer, Virginian, Honolulan. Drydock, paint, engine, boiler, hull repairs: Calistoga, City of Sacramento, Centralia, General Frisbie, General, Wilhelmina, Frank H. Buck, Maui. Engine, boiler, hull repairs: Katherine Donovan, Alvarado, Willpolo, Montpelier, Rose City, Thomas P. Beal, San Ugon, Maunganui, Sierra. Clean out, overhaul, and rejoint cargo lines: Paul Shoup. Remove present superheater: Somme. Damage repairs: Shell Co. Barge No. 6. Propeller repairs :Tug Standard No. 1, H. T. Harper (also bottom damage), Sierra S. C. T. Dodd. Boiler repairs: Sea Witch. Engine repairs: Willholo, Ethel L. One tailshaft: West Inskip, Tacoma, Laurel, Admiral Dewey, Yorba Linda. Piston repairs: William A. McKenney, Gold Star, President Garfield, Edgar F. Luckenbach, Richmond, Oneida. Misc. repairs: Tecumsen, Mongolia, H. M. Storey, Diana Dollar, Invader, Suwarinco, Los Alamos, American, Deroche, Paul Shoup, El Segundo, Lio, Maliko, Esther Dollar, San Pedro, Virginian, Nebraskan, India Arrow, Frank G. Drum, Argyll, Finland, George Washington, Charlie Watson, Montanan, barge Martinez, Missourian, K. I. Luckenbach, Iowan, F. H. Hillman, Standard Service, Invincible, A. L. Kent, State dredger No. 3, Columbian, Adventuress, Chas. Van Damme, Tingard, Port Saunders, Daisy, Haviside Barge No. 2, Bandon, Quinault, San Diego, West Cajoot, Montauk, Los Alamos, Cathwood, Point Bonito, Sea Witch, Zahma, W. R. Chamberlin, Jr., Tacoma, Barge 1922, Poinsettia, San Ubaldo, Omphale, Lewis Luckenbach, William A. McKenney, Socony, J. L. Luckenbach, Shreveport, San Patricio, General Pet. Barge No. 1, Sangstad, Secony, Varanger.

COLLINGWOOD SHIPBUILDING CO.,

Collingwood, Ontario.

Purchasing Agent: E. Podmore.

Bottom damage repairs, tail shaft drawn for examination, stern bearing rewooded: stmr. Royan (also rudder repairs), stmr. Glenfinnan, stmr. Martian (also rudder repairs).

CHARLESTON DRY DOCK AND MACHINERY COMPANY,

Charleston, S.C.

Drydock and repair: Power schr. Hussick, stmr. Schokarie. Misc. repairs. schr. Ell P, tug Hinton, ferryboat Palmetto, yacht Edith, U.S. tender Palmetto, lighter S-17, snag boat, lighter, two dredges.

CRAIG SHIPBUILDING COMPANY,

Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Clean, paint: yacht Elia, yacht Black Swan, dredge Shallue, yacht Ylarba (also new rudder and rebabbitt shafts), S. O. barge (also hull repairs).

LAKE WASHINGTON SHIPYARDS,

Houghton, Washington

Purchasing Agent: A. R. Van Sant.

Clean, paint, and new rudder post: tug Richard Holyoke.

LOS ANGELES SHIPBUILDING AND DRYDOCK CORPORATION,

San Pedro, Calif.

Partially recaulk and paint: derrick barge Sampson. Clean, paint, voyage repairs: stmr. Meton. Clean, paint: stmr. Sheaf Mead (also propeller changed, shaft refitted, rudder pintles rebushed), yacht Gallardo, barge William Muller, m.s. Florcana (also propeller repairs), fireboat No. 2 (sea valves refitted), stmr. British Star (sea valves refitted), S O. Barge No. 11, fireboat Progress, Oceania Vance (also repair steam and stern caulking).

U.S. NAVY YARD,

Bremerton, Wash.

Dock and misc. repairs: Colorado, West Virginia, California, McCawley, Mahopac. Misc. repairs: Maryland, Nevada, Henshaw. Misc. repairs incidental to operation as district craft: Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

PRINCE RUPERT DRY DOCK AND SHIPYARDS,

Prince Rupert, B.C.

Dock, clean, paint: C. G. M. Birnie (also tailshaft drawn for inspection and replaced), pile driver scow, dredge Lion (worm eaten places cemented. 23 fishing boats cleaned, paint, docked and miscellaneous hull and machinery repairs, 20 fishing boats repaired not requiring use of dry-dock. 49 other commercial jobs.

VICTORIA MACHINERY DEPOT CO.,

Victoria, B.C.

Cut out and renew damaged stem and seating, damage caused by collision: Princess Patricia. Engine and deck repairs: stmr. Gray. Dock, clean paint: tug Harriett, Princess Royal (also replace damaged propeller blades, cut out and renew planking in hull), derrick scow (also hull repairs), stmr. Charmer (also replace damaged propeller blades, hull repairs).

Personals and Items of Interest

The Dollar Steamship Company on September 16 reported several important changes in their traffic department. These changes were directly brought about through the resignation of **A. A. Moran,** who has been manager of the traffic department for the past eight years. Mr. Moran resigned due to ill health.

M. J. Buckley, who has been assistant to Mr. Moran, will be the new freight traffic manager; **R. R. Nickerson,** general agent for the company at Genoa, will be assistant freight traffic manager; **R. E. Richards,** assistant manager at Genoa, will take Mr. Nickerson's place as general agent on the Mediterranean.

Andy Moran is one of the best known traffic men on the Pacific Coast. Prior to his service with the Dollar Line he was with Swayne & Hoyt and later in business for himself in the firm of Moran and Fair.

Mike Buckley, the new freight traffic manager, has been with the Dollar Line for four years. Prior to that he was with the Pacific Mail and with the Shipping Board.

Mr. Nickerson, who is a native of San Francisco, has been with the Dollar organization since 1918 and in Italy for several years.

The Dollar Steamship Company also announces that **G. H. Hinkins** has been appointed manager of their New York office.

Fred Holmes & Son, ship brokers of San Francisco, were honored during September with a visit from **G. Allen Davis** of Liverpool, a member of the well known ship brokerage firm of D. & G. MacIver.

Mr. Davis is on a tour of the world and is visiting all of the Pacific Coast ports. The firm of Fred Holmes & Son is the pioneer ship brokerage firm on this Coast and has been in business for 58 years.

Kirkwood H. Donovan, Pacific Coast operating manager for the **Panama Pacific Line,** recently returned from New York, where he assisted in the formation of plans for the extension of his company's intercoastal business, which they will launch with the completion of the new passenger liner now under construction.

John E. Cushing, well-known in United States steamship circles as traffic manager of the American-Hawaiian Steamship Company, has been promoted to the office of vice-president of the company, according to an announcement by President Roger D. Lapham. Mr. Cushing also holds the office of treasurer of the line.

The American-Hawaiian Steamship Company has announced that, due to increased demand for tonnage out of the San Francisco Bay ports for the East Coast, there will be an extra sailing of the steamship Arizonan on October 12 from San Francisco, Oakland, and Alameda to New York, Philadelphia, and Baltimore.

The Gorman Shipping Company of Seattle has been formed by John J. Gorman to engage in general overseas shipping business. Mr. Gorman resigned as vice-president and general manager of the Yamashita Company, Inc., a position which he has held for the past four years. Mr. Gorman has been connected with large shipping corporations for the past twenty-five years, including Dodwell & Co. and the Pacific Steamship Company. He was for many years general agent of the latter company for the Orient, and is well known to shippers and shipping firms throughout the Pacific Ocean area.

McCormick Steamship Company has taken a long term lease on Albers dock No. 1 at Portland. This dock adjoins the company's terminal and will give a dock frontage of 1620 feet, the longest in Portland harbor. Hillman Luedemann is district manager.

R. K. Brown, Jr., Seattle district manager of the **General Steamship Corporation,** announced recently that arrangements had been completed whereby ships in the service represented by his corporation would berth at Pier 14 instead of Pier D and the Ames Terminal. A long term lease has been signed for Pier 14.

Harry S. Scott, president of the **General Steamship Corporation,** announced on September 15 that the Kerr Steamship Company, Inc. of New York, has decided to establish a freight service from San Francisco and Los Angeles to Japan, China, Philippines, Dutch East Indies, and the Straits Settlements. The new service will be inaugurated with the sailing of the fast modern express motorship Silverlarch from San Francisco January 10, to be followed by regular monthly sailings maintained by the Silverpine, Silverfir, Silverelm, and Silveray.

Swayne & Hoyt, Inc., operating freight service between Pacific Coast ports and ports on the Gulf, has announced that a change will be made in their service and the name of the line changed to the Gulf-Pacific Line. An agreement has been made to enter into joint service with the Steele Steamship Line, Inc. of New Orleans, N. M. Leach, president, whereby a joint service will be maintained by six ships from Pacific Coast ports to Houston, Mobile and New Orleans, to Puerto Colombia, Tampico, and Tampa; and to Beaumont and to Cartegena, Curacao, and Vera Cruz.

APPOINTMENTS.

Luckenbach Steamship Company reports that they will open their own offices at Mobile and New Orleans, October 1.

R. C. Ellis has been appointed general agent for the **Transmarine Lines** at Los Angeles. Mr. Ellis was formerly office manager at the Los Angeles office.

Columbia-Pacific Shipping Company has been chosen as general Oregon agents for the **Grace Line,** who will inaugurate regular service between this port and the West Coast of South America. The service heretofore has been intermittent.

Western Steamship Agency, Incorporated, at Los Angeles will act as Southern California agents for the **Canadian Transport Company, Ltd.,** of Vancouver, B. C., who report that they will maintain a regular monthly service from British Columbia to the West Indies via Los Angeles.

Edward Fitzgerald has been appointed city passanger agent for the **Panama Mail Steamship Company** in Los Angeles.

The San Francisco offices of the **Yamashita Co., Inc.,** are now located on the fourth floor of the Robert Dollar Building, 311 California Street.

David A. Burke has been appointed acting manager of the **United States Lines** at New York by President A. C. Dalton of the Emergency Fleet Corporation. Mr. Burke was formerly assistant to Manager Thomas H. Rossbottom, who resigned to resume his former position as president, manager, and director of the Panama Railroad Steamship Company.

OBITUARY.

J. A. Kennedy, former president and general manager of the Inter-Island Steam Navigation Company of Honolulu, died of heart trouble August 5 at his home on Oahu. Mr. Kennedy was born in Scotland 73 years ago and has lived in the Hawaiian Islands since 1878.

Charles E. Peabody prominent in shipping circles in the Pacific Northwest, died at Seattle on August 12 at the age of 69. Mr. Peabody was chairman of the board of the Puget Sound Navigation Company, president of the Pacific Shipping & Fuel Company, director of the twelfth district of the Federal Reserve Bank, San Francisco, and an official in many other enterprises.

Captain Edward Courtney, master of the steamer Pacific Fir, passed away suddenly at New York on September 11. Captain Courtney was a well known Pacific mariner.

WEEKLY INTERCOASTAL SERVICE

Largest
Pacific
Coastwise
Fleet
•
Freight
and
Passenger

Coast
to
Coast
•
New York
Baltimore
Philadelphia
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Baltimore and New York—Every Saturday
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A national organization operating 73 vessels Coastwise and Intercoastal provides the shipper of goods with a thoroughly dependable service. For the lumber trade, the mill has been brought to the mar ket through the medium of this transportation system. McCormick lumber distribution is world wide.

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SERVICE SINCE 1855

The American-Hawaiian S. S. Co. operates a Fleet of 26 Steamers and Motor Ships in the most frequent and dependable fast freight service

EASTBOUND FIVE DAY SAILINGS WESTBOUND
to and from
SAN FRANCISCO, LOS ANGELES—NEW YORK, PHILADELPHIA and BOSTON

TEN DAY SAILINGS
PUGET SOUND AND COLUMBIA RIVER PORTS—NEW YORK, PHILADELPHIA, BOSTON
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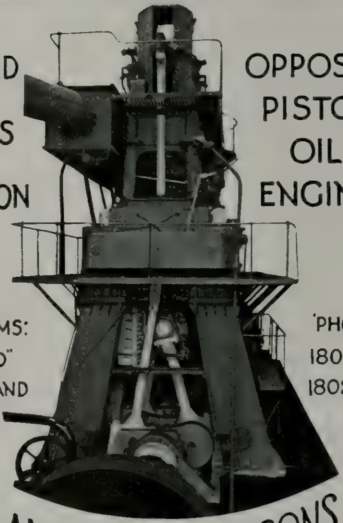

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SHIPBUILDERS & ENGINEERS
SUNDERLAND
BUILDING BERTHS WITH MECHANICAL TRANSPORT
FOR ALL TYPES OF VESSELS
540 FEET X 72 FEET

Improved Electric Flow Meter

(Continued from Page 458)

More briefly, the operation of the inductance bridge may be summarized by saying that the armature of the instruments moves in accordance with the motion of the manometer armature as the latter is moved up and down by the mercury float. Since the positions assumed are such that the relative voltages across the two parts of each coil are the same, the operation of the instrument is independent of the actual value of the line voltage. No current flows in the neutral wire and the currents in the two halves of each divided coil are equal except when the armatures are being moved.

The Integrator.

In order to make use of the simple inductance bridge method of operation, a special type of integrator was developed which increases the counter readings in proportion to the square root of the angular deflection of the recorder pen arm, this being the relation of flow to the pressure difference across the orifice. Attached to the gear train which drives the recorder chart is a sector of a disc which rotates at a constant rate. A roller is normally held up by a latch, out of contact with the sector. This latch is tripped when the sector is in different positions, depending upon the rate of flow, and the roller is rotated through an angle proportional to the rate of flow before the sector passes out of contact with it. After the sector passes beyond the roller the latter is again latched up and the process repeated at regular intervals.

The square root relation existing between rate of flow and pressure difference (the latter being translated into recorder pen travel) is reproduced in the relation between the angular travel of the disc and the pen deflection caused by an oscillating latch carrier driven by the rotating sector through a link.

Two important features of this design are: first, the parts are simple and can be made accurately under practical manufacturing conditions so that the square root relation is always reproduced correctly by the mechanism; and, second, such a simple integrating mechanism which reproduces the square root relation permits the employment of the inductance bridge method of transmitting the meter readings.

A series of printed charts are chosen with a fixed ratio between successive ranges. The manometers also are arranged to be adjusted for several appropriate ranges. This simplifies the choice of an orifice plate, the size of which depends chiefly upon the density of the fluid and the pipe size. With such an orifice the apparatus is easily adjusted for successive chart ranges by using a stand-pipe of proper size in the manometer. This is useful where the average load changes from time to time, for then the apparatus can be readjusted by changing the manometer stand-pipe instead of changing the orifice plate which is much less convenient.

The various manometers for use with steam operate on successive maximum pressure differentials increasing by intervals of about 60 per cent, ranging from 1.6 inches to 16 inches of mercury. There are six ranges in this series, the choice of a suitable manometer depending upon velocities encountered. Any manometer of the series, however, may be converted into the most sensitive one by simply opening a valve. This adapts the meter for use with one of the lower range charts, making it easily convertible for low load periods, which will be a distinct advantage in many types of service.

Where the apparatus must work on very low pressure differentials an especially sensitive type of manometer is provided, the most sensitive of which gives full deflection of the meter on a pressure difference of ½-inch of water, although the operating force of the meter mechanisms of this high-sensitivity series is as great as that of the high-range manometers.

The simple inductance bridge principle upon which all of these instruments operate, their freedom from troubles obviated by electrical connections that are permanent and external to the pressure chamber, their independence of voltage fluctuation, their automatic recording planimeters, the adaptability with which their manometers handle various ranges, their easy reading 5-figure integrating counters, the compactness of their operating units—the advantages of all of these various features—make this new flow meter especially desirable for measuring the flow of steam, water, gas, air, and other fluids and of exceptional interest to all power plant and industrial engineers and officials concerned with such measurements.

Book Review

Port Series No. 20, the Port of New York. Published by the Corps of Engineers of the United States Army and the United States Shipping Board.

The series of reports on the ports of the United States, being compiled by the Board of Engineers for Rivers and Harbors of the War Department, in cooperation with the Bureau of Operations, United States Shipping Board, is familiar to the transportation and shipping world. Announcement is now made of the publication of No. 20 of this series. devoted to the Port of New York. This report is in three volumes. Volume one is a general report covering subjects common to other reports in the series with the exception of data on piers, wharves, and docks. Volume two consists wholly of information regarding the piers, wharves, and docks of the port; while volume three is an atlas of maps of the waterfront.

Like its predecessors, the New York report gives full information with regard to port and harbor conditions, port customs and regulations, services and charges, fuel and supplies; facilities available for service to commerce and shipping, including piers, wharves, dry docks, ship repair plants, coal and oil bunkering, grain elevators, storage warehouses, bulk freight storage, floating equipment, wrecking and salvage equipment; railroad and steamship lines and their charges and practices in connection with terminal service. There are numerous photographs of the important piers and terminal developments, made especially for the report by the United States Army Air Service.

The report shows that in all there are 868 piers, 56 ferry landings, 93 carfloat bridges,57 shipbuilding, drydock, and repair plants, 626 bulkheads, and 184 shore wharves

NEW COMPENSATOR

TO meet the demand for a compensator which will cover ratings above 30 horsepower on 220-volt circuits and 60 horsepower and up on 440 and 550-volt circuits, the General Electric Company has introduced a new design designated as Size No. 2. Two-part construction is employed in order to meet a wide variety of installation requirements.

One unit of the compensator consists of an oil-immersed, double-throw switch with temperature overload relay, push button station, and undervoltage release. The other unit consists of an auto-transformer. Each unit is provided with a conduit box.

The control box is so arranged that the oil box may be lowered to allow examination of the switch parts and renewal of fingers and wedges. This unit can be wall mounted or attached to a pipe support.

The auto transformer is inclosed in a cast iron box with a removable cover to allow changing tap connections when desired. The conduit box mounted on the top of this case provides ample room for making connections. The front of the conduit box is removable, the entire interior thus being accessible in order that joints may be tightened and properly taped.

Pacific Marine Review

The National Magazine of Shipping

November, 1926

--APPROVED--

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AMERICAN BUREAU OF SHIPPING
BRITISH BOARD OF TRADE

Adopt An Approved Fire System Which Provides Rapid, Safe Operation And

"Fire Extinguishing Without Damage"

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The
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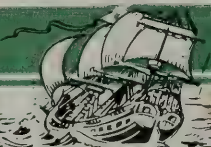
for Extinguishing Fire aboard Ship



Official Organ
PACIFIC AMERICAN

Official Organ
SHIPOWNERS' ASSOCIATION

Pacific Marine Review, Vol. 23, No. 11, Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

37 Plants and 105 Warehouses spell protection

WHEN YOU order oxygen, you may come in contact only with the Linde district office and with the warehouse from which it is shipped. But you know that the oxygen will reach you without delay.

It does not matter whether the order is for a single cylinder or a carload. It makes no difference whether every customer in your district wants oxygen on that particular day. There are 37 Linde plants and 105 Linde warehouses in the country, a total of 142 sources of supply, and their resources can be mobilized quickly and easily at any point.

This means that your oxygen supply will never fail, even in times of severe stress.

THE LINDE AIR PRODUCTS COMPANY
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General Offices: Carbide and Carbon Building
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37 Plants · *105 Warehouses*

HOW many times a single spot in an otherwise sound tank gives way! Perhaps it is a riveted seam or perhaps a flaw in the metal. There is a Linde Procedure Control which tells you how to repair such a break safely and economically. There are very few pieces of equipment that cannot be reconditioned economically by the oxy-acetylene process.

LINDE OXYGEN

Pacific Marine Review

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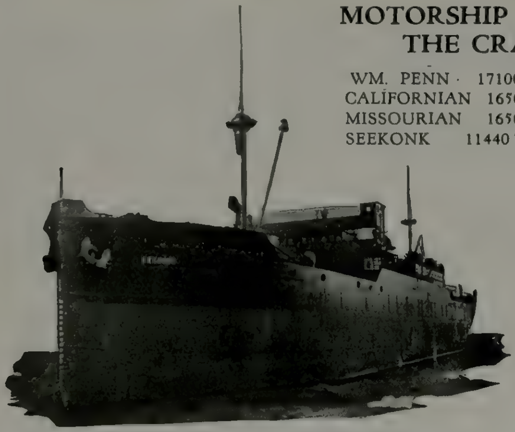
PACIFIC OCEAN SHIPPING

MOTORSHIP INSTALLATIONS BY THE CRAMP COMPANY

WM. PENN	17100 Tons Displ.	4500 I. H. P.	11 Knots
CALIFORNIAN	16500 Tons Displ.	4500 I.H.P.	12 Knots
MISSOURIAN	16500 Tons Displ.	4500 I.H.P.	12 Knots
SEEKONK	11440 Tons Displ.	2300 I.H.P.	10¼ Knots



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ONE OF THE HOG ISLAND "A" BOATS, CONVERTED FROM STEAM TO DIESEL DRIVE, USING 6-CYLINDER, 4-CYCLE B. & W. LONG STROKE, SINGLE SCREW ENGINE, INSTALLED IN THE ORIGINAL MACHINERY COMPARTMENT OF THE STEAMER.

COMPARISON OF THE SEEKONK'S PERFORMANCE, IN SERVICE, WITH THE AVERAGE OF SEVERAL OF HER STEAM DRIVE SISTER SHIPS, SHOWS THE FOLLOWING RESULTS:

ONE FOURTH

THE FUEL CONSUMPTION OF THE STEAMERS, AT ONE-QUARTER KNOT HIGHER AVERAGE SPEED.

ONE TENTH

THE FUEL CONSUMPTION IN PORT OF THE STEAMERS.

MEANS OF FIRST THREE VOYAGES OF 41,000 MILES

I.H.P. MAIN ENGINE, 2237 R.P.M., 85.8; SPEED	10.23 Knots
CONSUMPTION PER DAY AT SEA MAIN & AUXILIARY ENGINES	7.41 Tons
CONSUMPTION PER DAY IN PORT	0.70 Tons
CONSUMPTION PER I.H.P. MAIN AND AUXILIARY ENGINES	0.298 Lbs.
KNOTS PER TON OF FUEL	32.70

Under the Burmeister & Wain System there were up to Sept. 1, 1926, put into actual service 269 Motorships totalling 1,483,202 Gross Tons and 890,195 I.H.P.

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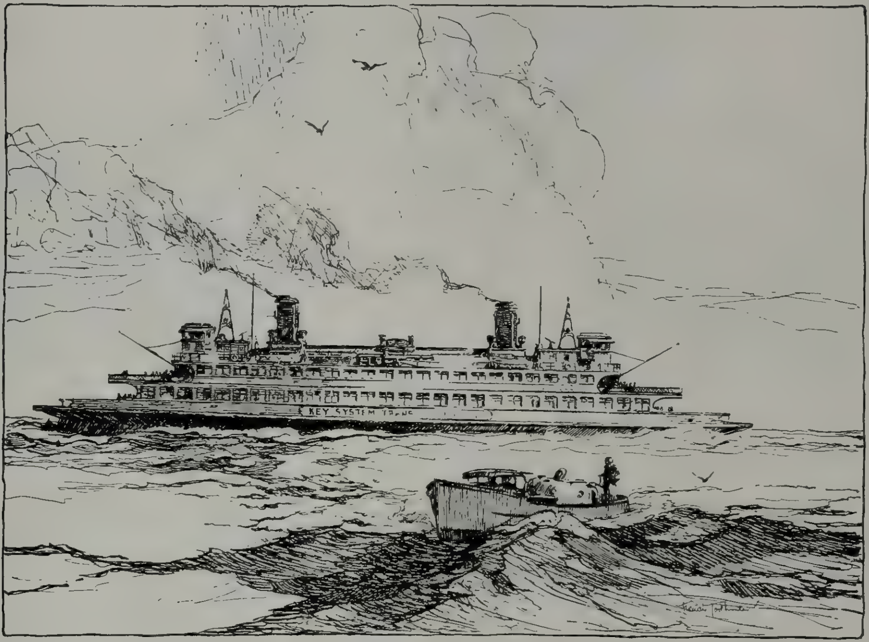

KEY TRANSIT SYSTEM FERRIES PERALTA AND YERBA BUENA

[From Painting By Francis Todhunter]

New De Luxe Passenger Ferries
For Transbay Service Between
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Washington Estep Diesel Engine was selected to furnish power for Capt. Jas. Griffiths' fine motor yacht, Sueja III.

A Super Engine Built For Super Service Which it Delivers!

The working out of the principles involved in the Washington-Estep Diesel Engine aimed at the building of a super engine designed for unusual service. The fact that

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have delivered such service is suggested by the number of re-orders shown on our books. Users who originally bought these engines with the expectation that they would meet difficult requirements are re-purchasing — and, invariably, WITH ENTHUSIASM.

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"WASHINGTON ESTEP" DIESEL ENGINES

NOVEMBER 1926 Vol. XXIII. No. 11

Pacific Marine Review

The National Magazine of Shipping

Official Organ
Pacific American Steamship Association

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Official Organ
Shipowners' Association of the Pacific

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Entire contents copyright, 1926, by J. S. Hines. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie
Editor.

Paul Faulkner,
Advertising Manager

Ferrying San Francisco Bay

SAN Francisco Bay is a remarkable body of salt water. It affords deep water anchorage sufficient to take care of the navies of the world and the bulk of the world's merchant marine. On its shores there exist today over forty separate and distinct ports. Many of these can show statistics of tonnage that entitle them to world recognition. Many are potentially great ports.

Perhaps the most spectacular feature of San Francisco Bay is its transbay transportation facilities. Passenger traffic between San Francisco and the East Bay cities many years ago reached proportions demanding the largest passenger ferries in the world. Of more recent and much more rapid growth, the vehicle traffic across the bay has repeatedly forced the operators to build more and better ferries. During the past four years nine ferries, especially adapted for vehicle transport have been built in San Francisco Bay shipyards and are operating on San Francisco Bay. During the past two months nine more have been ordered for prompt construction and delivery. These last orders are as follows:

Southern Pacific Company—3 ferries from Bethlehem Shipbuilding & Drydock Corporation, Ltd.

Northwestern Pacific Railroad—2 ferries from The Moore Dry Dock Company.

Northwestern Pacific Railroad—1 ferry from General Engineering & Drydock Company.

Golden Gate Ferry Company—3 ferries from General Engineering & Drydock Company.

All of these boats are for diesel-electric propulsion. The first six are to be steel hulls, the other three of wooden construction. The electric propulsion idea is taking firm root with San Francisco Bay ferry operators. There are now in service on San Francisco Bay three diesel-electric and two steam turbo-electric ferries, all giving very satisfactory service.

The present ferryboat building program includes also two splendid steel passenger ferries, under construction at The Moore Dry Dock Company for the Key System Transit Company, which will be steam turbo-electric.

San Francisco Bay ferryboat operators pioneered in electric propulsion and are reaping good rewards for their daring and initiative.

This ferry building program means the distribution through San Francisco shipyards of nearly eight million dollars for materials, equipment, and labor, a very satisfying stimulant to our shipbuilders.

More than that is the trend indicated by this building movement, a trend to modern efficiency and economy in marine transportation, through which the shipbuilder can take courage to hold his grip and to plan for the great replacement and conversion program which is sure to come and that at no very distant date.

Marine Art

CHARLES R. Patterson, noted American marine artist, came to San Francisco about the middle of August last with the purpose of painting some marine subjects. Patterson followed the sea in his youth and as an apprentice on a British square rigger came first to this port in 1894. He was in and out of the Golden Gate a number of times in the years following and had considerable yachting experience on the Bay, his last previous visit occurring in 1899.

Through the courtesy of the Navy Department, Patterson was a guest on the August cruise of the Pacific Fleet from Seattle to San Francisco and was allowed the special privilege of a destroyer on the trip from San Francisco to San Diego, so that he could observe the action of waves on battleships under way at sea.

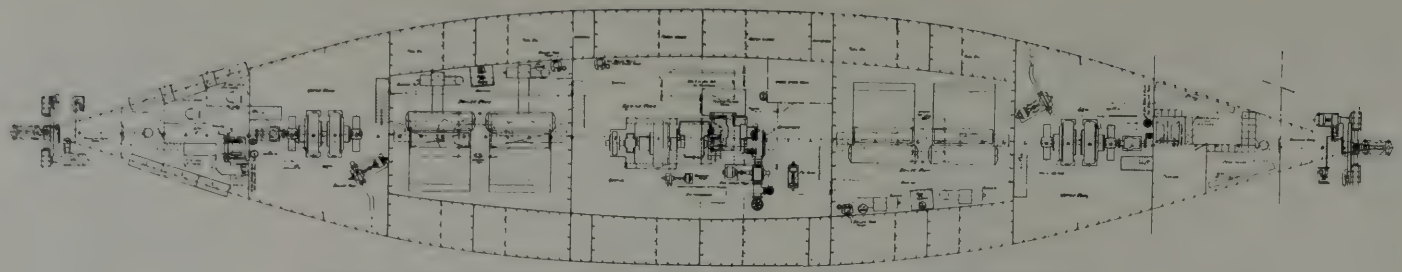
As a result of his San Francisco work, a number of notable marine canvasses have been produced, which were on exhibition at a San Francisco gallery for a few days prior to their shipment to New York for showing early in November. Among these were two colorful studies of old square rigged ships laid up in the tules at Antioch, two very fine spirited views of the battleship California at sea, and a marine idyl entitled "Outward Bound in Ballast."

Charles R. Patterson is a member of the National Arts Club and The Salmagundi Club of New York, and also of the American Water Color Society and the Allied Artists of America. His pictures are in many of the most important collections in America. Prominent in the gallery of the Boston Art Museum hangs Patterson's picture of the frigate Constitution that was painted for the campaign to restore "Old Ironsides."

The John Fritz Medal

OCTOBER 15 the John Fritz Gold Medal for 1927 was awarded to Elmer Ambrose Sperry of New York for the development of the gyro-compass and the application of the gyroscope to the stabilization of ships and aeroplanes. This award was made unanimously by the board of sixteen representatives of the American societies of Civil, Mining & Metallurgical, Mechanical and Electrical engineers.

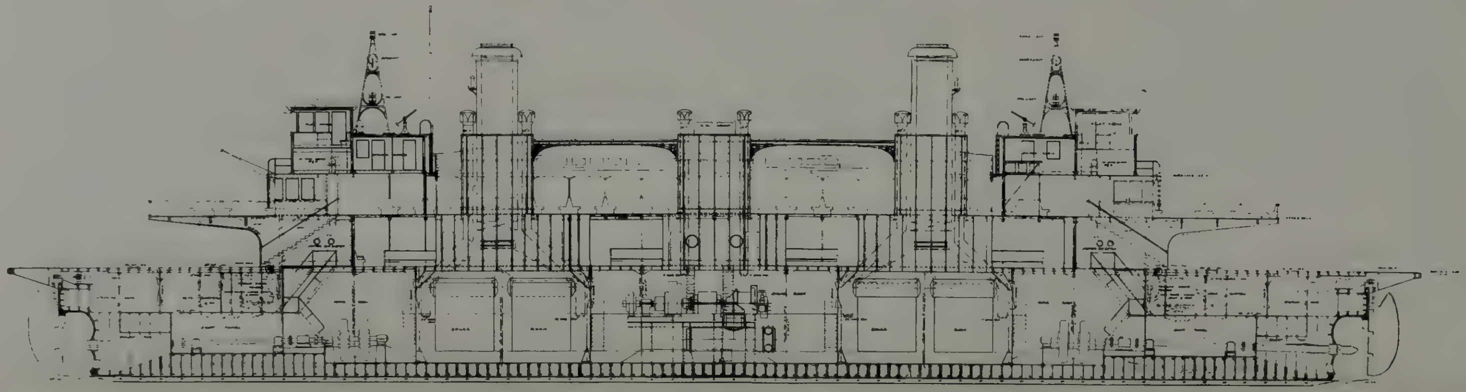
This medal is awarded not oftener than once a year for notable scientific or industrial achievement as a memorial to John Fritz, long a leader in the American iron and steel industry.



GENERAL CHARACTERISTICS KEY SYSTEM TRANSIT COMPANY'S FERRIES

Length over all	276'0"
Length between rudder posts	256'0"
Length between perpendiculars	256'0"
Breadth over guards	70'0"
Breadth molded at sponsons	47'0"
Depth of hold	18'4"
Depth molded	21'0"
Sponson overhang	11'6"
Normal light displacement	1754 tons
Normal light draft—keel	13'7½"
Normal load displacement	2015 tons
Normal load draft—keel	14'9½"
Deadweight capacity	261 tons
Passenger capacity	4000
Seats	2340

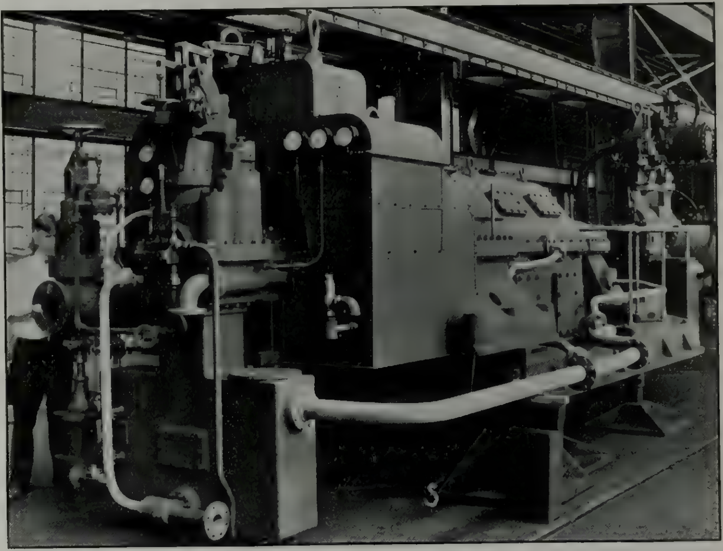
Normal S. H. P.	2250
Maximum S. H. P.	2600
Speed (Normal S. H. P. (Normal light displacement	14. 5 knots
Speed (Maximum S. H. P. (Normal light displacement	15 knots
Propeller Revolutions (Normal S. H. P. (Normal light displacement	200
Capacity—fuel oil	228 tons
Capacity—fresh water	153 tons
Capacity—stores	18 tons
Normal fuel oil—⅔	152 tons
Normal fresh water—⅔	102 tons
Normal stores—⅔	12 tons
Capacity trimming tanks—each	60 tons



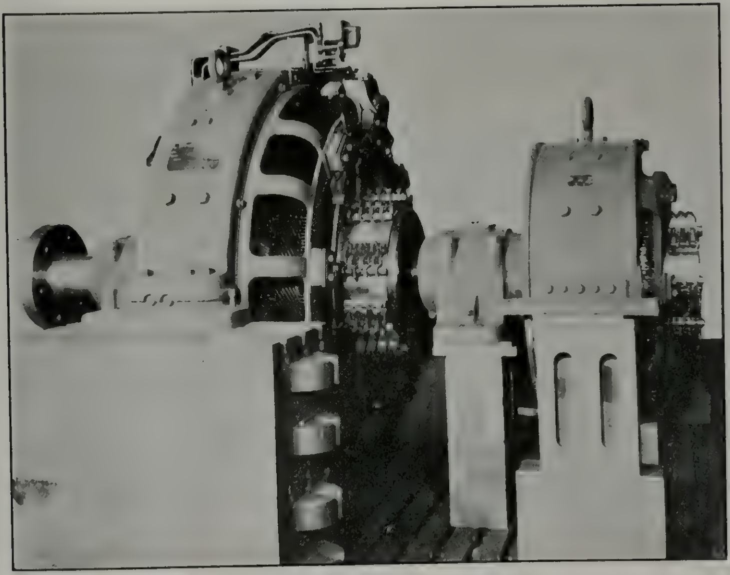
Machinery arrangement plan, general characteristics, and inboard profile of new de luxe passenger ferries building at The Moore Dry Dock Company to the plans and under the supervision of Hibbs, McCauley & Smith of San Francisco for the Key System Transit Company's passenger service across San Francisco Bay.

Passenger Ferries De Luxe

New Steel Turbo-Electric Ferries, Designed By Hibbs, McCauley & Smith and Built at The Moore Dry Dock Company For The Key System Transit Co., Set New World Standards For Transbay Commutation Service



View above shows Westinghouse-Parsons steam turbine and reduction gears for driving main generator on the new Key System Transit Company's ferryboats Peralta and Yerba Buena. View below shows Westinghouse direct current generator and exciter to be driven by this turbine.



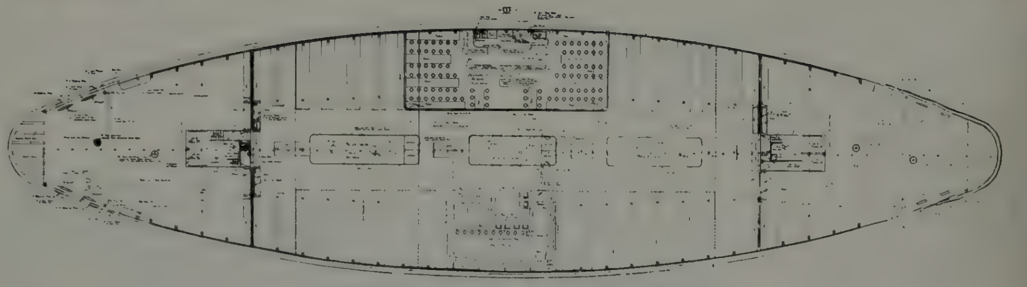
EARLY in 1927 there will be placed in service on the San Francisco - Oakland run of the Key System Transit Company two steel, steam turbo-electric propulsion passenger ferries, designed by Hibbs, McCauley & Smith of San Francisco and built by The Moore Dry Dock Company at their Oakland yard.

These two vessels will represent, when completed, a new standard in ferryboat construction and engineering. By reference to the plans and the midship section reproduced herewith, several novel features will be apparent. The plates and shapes used are of such weight and so disposed as to give a very stiff and adequate foundation for the machinery and at the same time to produce a hull which will give the maximum efficiency for propulsive effort.

It will be noted that in stiffening the hull the designers have boldly introduced longitudinal water-tight bulkheads, and this feature has already drawn some criticism from naval architects who have apparently overlooked other provisions made by the designers to offset any detrimental effect that might otherwise result. As the midship section shows, the sponsons are made an intregal part of the structure of the hull and are, themselves, completely plated for water-tightness. They therefore form not only an adequate protection against possible piercing of the hull by collision, but also insure adequate flotation of the hull should the hold be flooded from any possible cause. Elaborate provision has been made for the trimming of these vessels through ballast tanks and a system of large capacity centrifugal pumps and piping. Wailes Dove-Hermiston bitumastic is used for interior coating on all inclosed underwater spaces to insure against corrosive action and reduce maintenance cost.

Power Plant

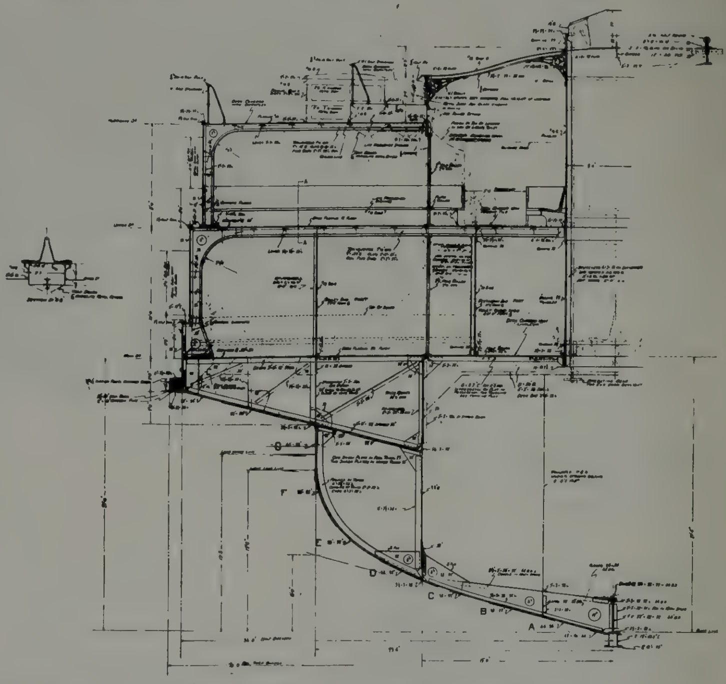
The new ferries will be among the fastest on San Francisco Bay, having a possible speed of 15 knots and a normal



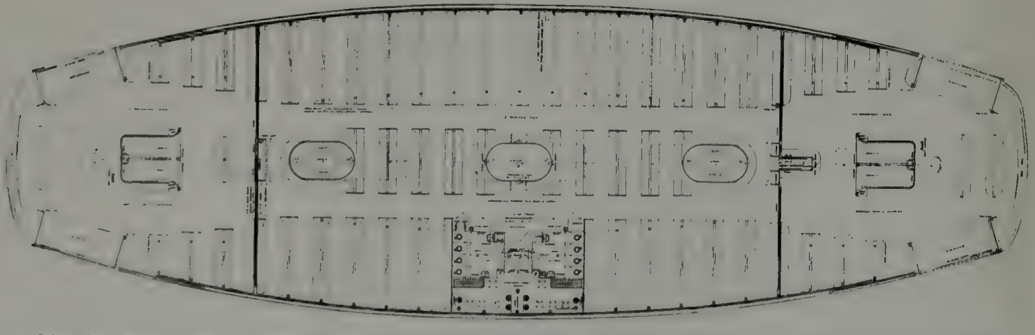
Arrangement plan of main deck of new Key System ferries.

working speed of 14.5 knots. The power plant on these boats approximates a well designed central station ashore. Four Babcock & Wilcox water-tube boilers, arranged in pairs in two separate boiler rooms, provide steam at 250 pounds throttle pressure and 100 degrees superheat to a Westinghouse-Parsons turbine of a normal rating of 3010 brake horsepower and a maximum duty rating 3430 horsepower. This turbine operates at 3600 revolutions per minute, driving through single reduction gearing a Westinghouse direct current generator and exciter at 514 revolutions per minute. The generator in this set is rated at 1900 kilowatts normal output and 2150 kilowatts maximum output, and the exciter is of 200 kilowatts normal output.

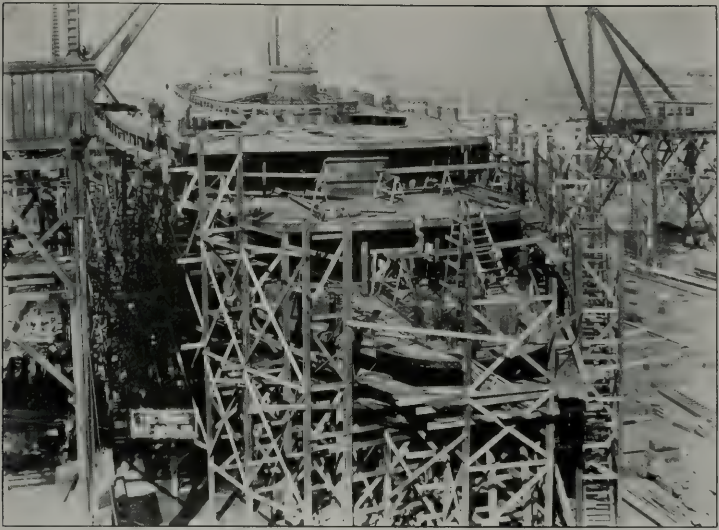
It will be noted from the inboard profile that the turbogenerating set is mounted on a structural platform with the condenser immediately below the turbine. This arrangement gives a roomy, cool engine room with the possibility of arrange-



Midship section of new Key System ferries. Note arrangement of longitudinal water-tight bulkheads and water-tight plating of sponson overhang. With the hold flooded, it is claimed that these boats will float on the sponsons.



Saloon deck plan of the new Key System ferryboats. Seats are provided on these boats for 2340 persons. The total carrying capacity, including standing space and as measured by life preserver equipment, is 4000 persons.



View at The Moore Dry Dock Company showing construction work on the Peralta a few days before she was launched.

ment of auxiliaries to give the maximum convenience and accessibility. A Hickman air separator, furnished by the Western Engineering Company of San Francisco, insures against corrosion due to entrained air. The exciter of the generating set is of sufficient capacity to take care of the auxiliaries, lighting, and ordinary power load as well as the excitation of generator and motor field. For emergency purposes and as a stand-by there is to be installed a 200 kilowatt Westinghouse turbo-generating set, located on a platform at sufficient height to comply with the rules of the Steamboat Inspection Service covering emergency lighting sets.

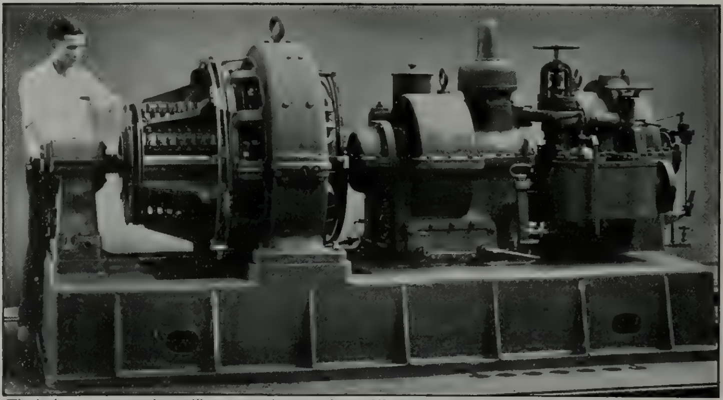
This central power plant supplies current to the two double unit Westinghouse marine propulsion motors, which drive the forward and after screws independently and differentially, the speed of the motors being controlled from either of three control stations, one in each pilot house and one in the engine room. This control is on the Ward-Leonard system and gives to the pilot complete control of direction and speed of either or both propellers. The propelling motors each have a normal rating of 2250 horsepower and a maximum duty rating of 2600 horsepower, driving the propeller at 200 to 215 revolutions per minute. Propeller thrust is taken on Kingsbury thrust bearings and the propeller shaft bearing is of the McNab-Vickers patent type.

A Sharples lubricating oil centrifuge insures pure lubricating oil for the turbines and gears. All auxiliary machinery throughout the vessel will be driven by Westinghouse motors, and the various pumps will be supplied by the Worthington Pump & Machinery Corporation.

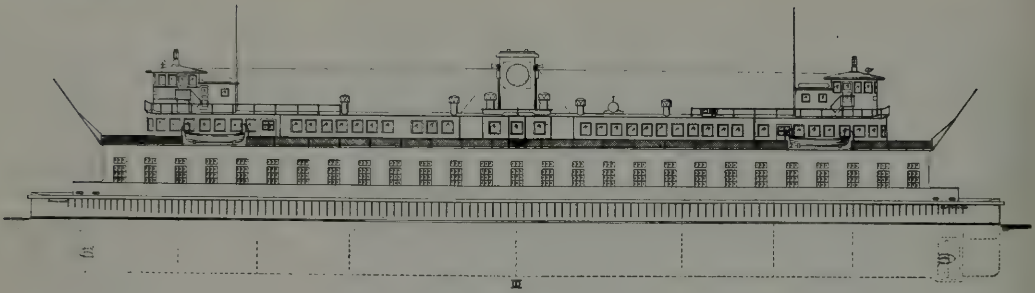
Passenger Accommodations

With teak trim, polished brass hardware, and Vehisote panel ing, the passenger saloon of the new Key System ferryboats will present a very attractive appearance. The special designing of molded Haskelite seats and backs for the settees will insure, together with the smoothness of operation of an electrically propelled vessel, the maximum of comfort for passengers. Note in the saloon deck plan the arrangement of ladies' rest room, with broad plate glass windows overlooking the water, convenient writing desks and dressing tables, and overstuffed easy chairs and settees, which will be finished in Persian leather, blue for one vessel and green for the other. Special attention has been given to the designing of the galley equipment and seatings and tables for the restaurant. The galley will be completely equipped with electrical cooking devices for short order service. All tables will be topped with a single slab of specially moded Sani-onyx in pure white.

The saloon deck will be entirely covered with interlocking rubber tiling supplied by the New York Belting and Packing Company from their direct factory branch in San Francisco. This material was selected on account of the possibilities in pleasing color combinations and also on account of the reputation for unusual durability based on the service rendered by this material on the ferryboat Berkeley, where the flooring has had twenty-eight years of constant use and is still rendering efficient, satisfactory service. One prominent feature in connection with this flooring will be the inset of the Key System insignia in special rubber tiles at each end of the deck set into the flooring. Battleship linoleum will be used on the main deck floor inside and Duraflex "A" flooring on all exposed decks.



Westinghouse steam turbo-auxiliary generating set of 200 kilowatt capacity as installed on the Key System ferries Peralta and Yerba Buena.



New Steel Auto Ferries

Six Diesel-Electric, Double End Screw, Steel Ferryboats now Building in San Francisco Bay Shipyards for Southern Pacific Company and Northwestern Pacific Railroad

As announced in the October issue of Pacific Marine Review, the Southern Pacific Company contracted with the Bethlehem Shipbuilding Corporation for three new steel ferries and the Northwestern Pacific Railroad contracted with the Moore Dry Dock Company for two and with the General Engineering & Drydock Company for one similar ferry. These boats were described in a general way in an article published in the October issue. There follows herewith a more detailed description of the power plant of these boats. Detailed drawings are not available as we go to press. These will be published later, probably in the December issue.

Power Plant

The main power plant in each of these boats will consist of four 450 brake horsepower Nelseco diesel engines, each direct connected to a 275 kilowatt, 250 volt shunt wound, separately excited, direct current generator and, mounted on the same shaft, a 40 kilowatt, 125 volt, compound wound exciter. These units will deliver the rated power at 230 revolutions a minute. The generators operate in series, supplying current at 1000 volts to the main propulsion motors which are of double unit type, shunt wound, and separately excited with forged flanged shafts. On continuous duty rating each of these motors will deliver 1250 shaft horsepower at 100 to 130 revolutions a minute with 500 volts on each armature.

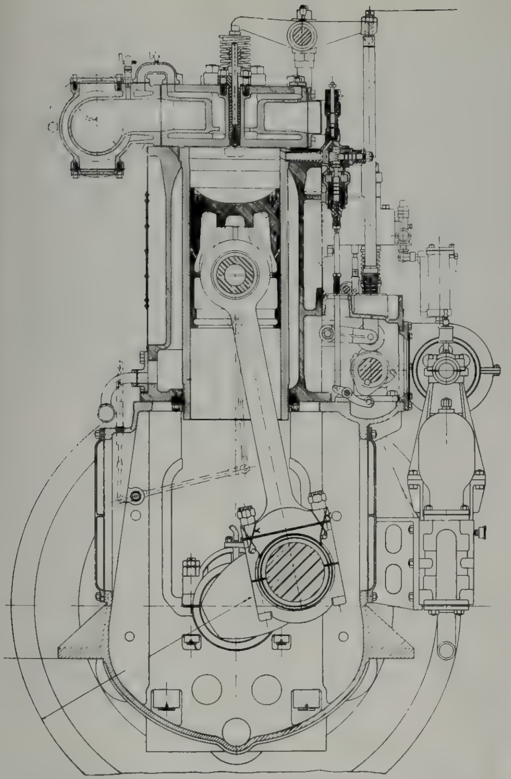
The two boats to be built by The Moore Dry Dock Company will be equipped with Westinghouse main generators and propulsion motors. The other four boats will have General Electric generators and motors.

Main Engines

The Nelseco engines are of the vertical, 6-cylinder, 4-cycle, single-acting, mechanical injection, full diesel type, 15-inch bore by 22-inch stroke, each developing 450 horsepower at 230 revolutions per minute. The bedplate and housing extend the entire length of the working cylinders and are made of cast iron of extremely rigid design, the oil pan being cast integral with the bed plate. An angle section extends the entire length along each side. These are drilled for bolting to the foundations. Box sections which act as seats for the main bearing shells tie the two angle sections rigidly together. The housing extends upwards, forming the crankcase, and this part has large openings on either side opposite each crank. The top of the housing is faced off as it supports the cylinder block. The cylinder block, which is of cast iron, is bolted to the top of the crankcase enclosing the top of it. The cylinder block is designed to allow ample cooling space around the cylinder liners, and space is also provided in the block for an air chamber for the air intakes, the openings of which are covered with slotted plates, the whole design being such as to silence the noise of the air intake.

The cylinder block and bedplate are held firmly together by large steel tie bolts extending the whole height of the engine and which take practically the whole combustion load, thus relieving the cast iron bedplate and cylinder block of this duty. The cylinder liners, which are simple cylindrical castings of special close grained cast iron, are machined on both sides, fitted into the block and held securely at the upper end, the lower being free to expand. A packing joint is provided at the lower end to prevent cooling water entering the crank case. The cylinder heads, of a special close-grained cast iron, are provided with six cover plates, which may be removed for inspection or cleaning. Openings are made for the inlet and exhaust valves and the fuel nozzle. Special provision is made for the cooling water which is directed first at a high velocity across the under side of the head, as this is the hottest surface, and then at a lower velocity throughout the rest of the head. This system has proved especially efficient as it maintains the upper and lower surfaces at a more uniform temperature, thereby eliminating practically all distortion stresses and resultant fractures.

The inlet, exhaust, air starting, and safety valves, all of the poppet, spring loaded type, are carried in separate cages and so may be readily removed. Inlet and exhaust valves are interchangeable. The cam shaft is located at the top of and on one side of the crank case, being driven through spur gears from the crank shaft at one-half engine speed. It carries all of the cams for operating the inlet, exhaust, and air starting valves as well as for operating the fuel injection pumps. The entire camshaft assembly is enclosed by



Section through cylinder of the Nelseco nonreversible diesel engine as supplied by the King-Knight Company San Francisco for diesel-electric propulsion on the new steel ferries for Southern Pacific and Northwestern Pacific Railroad.

a sheet metal casing which retains the lubricating oil and serves as a guard.

Main bearings are of cast steel lined with bearing metal. The bottom half is a semi-circular shell, eccentrically machined so that it may be readily rolled out for inspection. The top half forms a solid cap. Shims are provided for adjustment. The crankshaft is of special carbon steel drilled for forced feed lubrication for the main and crank pin bearings. The forged steel connecting rods have a T head for bolting to the crankpin box and an eye in the upper end to take the phosphor bronze wrist pin bushing. The crank pin box is of cast steel lined with bearing metal and is in two parts with shims between. The connecting rod is drilled for the forced feed lubrication of the wrist pin bearings.

Separate fuel injection pumps, operated from the cams on the cam shaft, are provided for each cylinder. The body of the pump is a solid block of steel, assuring tightness and strength, with drilled holes for the passage of the oil and for the valve chambers. The quantity of fuel delivered to the cylinder is governed by the by-pass valve located on the discharge side of the pump and controlled by the governor and hand throttle. The fuel oil flows from an overhead gravity supply tank, passing through duplex strainers before being supplied to the pumps. The fuel is forced from the pump through copper tubing to the fuel oil injection nozzle located in the cylinder head, which breaks the oil into a highly atomized form resulting in clean combustion without detonation or an excessive rise of cylinder pressure.

The lubricating oil system is extremely simple since the oil flows by gravity from an overhead supply tank to a header with distributing lines to each of the main bearings. From these bearings the oil passes through the drilled crankshaft to the crank pin bearings and from there up the drilled connecting rods to the wrist pin bearings. Separate lines from the main oil header lead to the cam shaft bearings and lubricate the cams and rollers. Oil draining down into the crankcase is returned to the overhead supply tank by the lubricating oil pump which is attached to the engine.

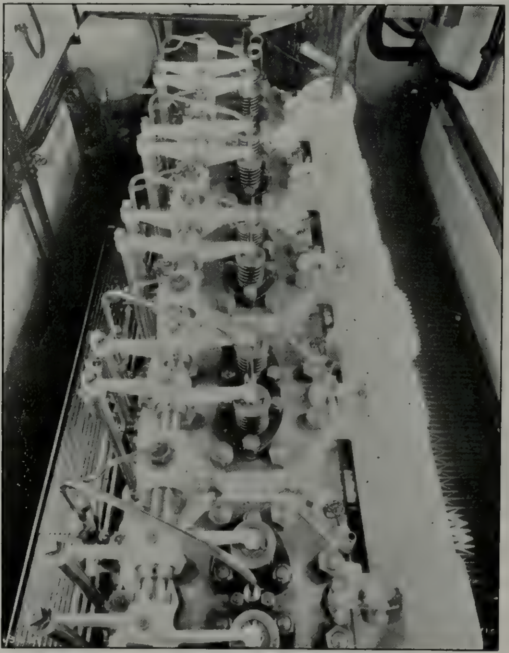
Circulating water, lubricating oil transfer, and fuel oil transfer pumps are attached to the engine and are of the vertical, single-acting, plunger type. The speed governor is also driven from the crankshaft and acts directly on the fuel oil pump by-pass valves.

The over-all length of these engines is 18 feet 9½ inches, with a width of 4 feet 8 inches, and an over-all height of 10 feet 1½ inches. The gross weight is approximately 80,000 pounds.

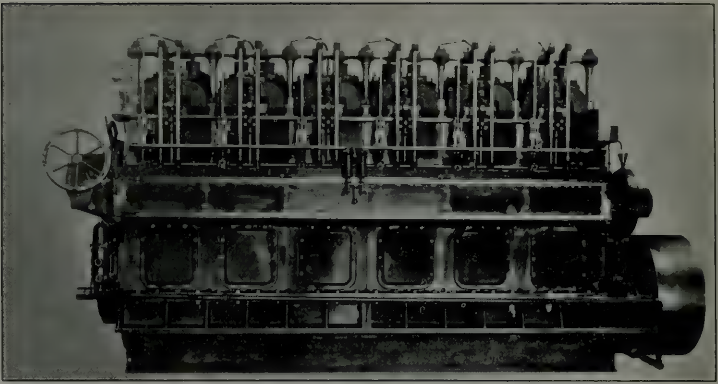
Silencers for the engines will be furnished by the New London Ship and Engine Company, manufacturers of the Nelseco diesel engines, and complete spares, under American Bureau of Shipping requirements, will be furnished with each boat.

Auxiliary Machinery

Auxiliary machinery will also be furnished by King-



A close-up of the top of a Nelseco diesel showing arrangement of valves and construction of head.



View of the operating side of a 6-cylinder, marine type, Nelseco diesel. Note simplicity of the design and sturdiness of all the parts. Twenty-four of these engines are now on order for the diesel-electric auto ferries for San Francisco Bay service. This constitutes one of the largest orders for commercial diesels for marine service ever placed with an American manufacturer.

Knight Company, of San Francisco. A list of the auxiliaries on each boat is as follows:

One auxiliary generating set consisting of one 60-kilowatt, 125-volt, 1150 r.p.m. direct current generator mounted on a cast iron base with and driven through a flexible coupling by a Sterling model GRC, four-cylinder gasoline engine developing 120-horsepower at 1200 r.p.m.

An emergency fire pump unit consisting of one Northern rotary pump, capacity 500 gallons per minute against 125 pounds pressure. This pump will be mounted on a unit cast iron base with and driven through a flexible coupling by a 50-horsepower, 570 r.p.m., 125-volt, compound wound, direct current, marine type continuously rated motor.

A fire and bilge pump unit consisting of one Northern rotary pump, capacity 500 gallons per minute against 125 pounds pressure. This pump will be mounted on a unit cast iron base with and driven through a flexible coupling by a 50-horsepower, 570 r.p.m., 125-volt, compound wound, direct current marine type continuously rated motor.

An air compressor unit consisting of one Gardner-Rix, 2-stage water cooled compressor with a capacity of 21 cubic feet per minute at 500 r.p.m. This compressor will be mounted with and driven by a 2-horsepower, 1700 r.p.m., 125-volt, compound wound, direct current motor.

A fresh water pump unit consisting of one Byron Jackson 1 by 10, 30 gallons per minute, 75-foot head, 1700 r.p.m. bronze fitted pump with monel shaft. This pump will be mounted on a unit cast iron base with and driven through flexible coupling by a 3-horsepower, 1700 r.p.m., 125-volt, compound wound, direct current motor.

A hot water pump unit consisting of one Byron Jackson 1½ by 10, 100 gallons per minute, 75-foot head, 1700 r.p.m. bronze fitted pump with monel shaft. This pump will be mounted on a unit cast iron base with and driven through a flexible coupling by a 5-horsepower, 1700 r.p.m., 125-volt, compound-wound, direct current motor.

A sanitary pump unit consisting of one Byron Jackson 2 by 11, 250 gallons per minute, 75-foot head, bronze fitted pump with monel shaft. This pump will be mounted on a unit cast iron base with and driven through a flexible coupling by a 10-horsepower, 1750 r.p.m., 125-volt, compound wound, direct current motor.

All motors will be furnished with remote control, push button starters, and all motors and starters will be of the marine type with noncorrosive fittings.

The boats with General Electric main generators and propulsion motors will have General Electric motors on all of the auxiliaries. The boats equipped with Westinghouse main generators and propulsion motors will be equipped with Westinghouse motors throughout.

Control

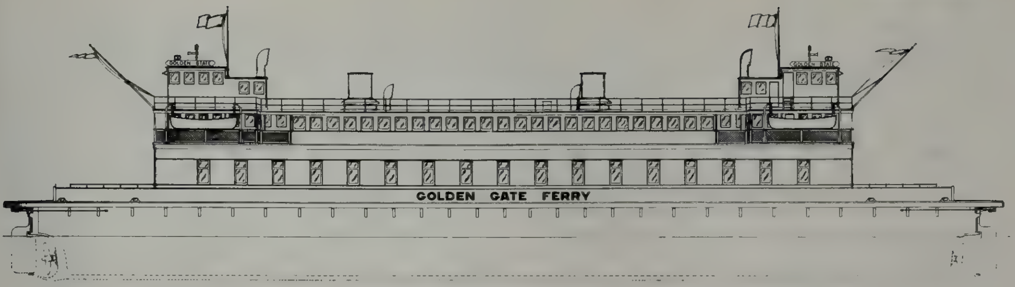
There will be three control stations, one in each of the pilot houses and one in the engine room. The pedestal type controller in the pilot houses gives the pilot complete control of the ship, he being able with this control to govern the speed of the ship, the direction of travel, being able to go immediately from full speed ahead to full speed astern, and having complete control of the steering motor. In going in a definite direction the speed of the boat is controlled by the pilot in the forward pilot house, and at the end of the trip the control is reversed to the other pilot house by the engineer in the engine room. In case it is necessary or desirable to control the boat from the engine room this can be accomplished by switching the control to the station in the engine room, and the signals from the pilot house be transmitted by means of the engine room telegraph.

There will be located in each pilot house, and in the engine room, revolution indicators which will at all times indicate the speed of the forward and the aft propellors, giving the pilot a very close check upon the speed of the boat.

The main propulsion control switchboard will be located in the engine room, and so arranged that no live parts will be exposed. The auxiliary generator will be controlled from a separate switchboard in the engine room, and the separate exciter switchboard will be so arranged that one exciter may be used for excitation of the main drive generators and motors, and any two for furnishing power to the auxiliaries, leaving one exciter as a spare.

All of the electrical and mechanical details have been very carefully studied out by the engineering department of the Southern Pacific Company, and the decision to make the change to diesel-electric drive was determined only after the flexibility and economy of this method of propulsion had been proved.

Each of these six ferryboats will be equipped with two Cunningham straight electric steering gears arranged for independent control of each rudder from the pilot house through Sperry Telemotors.



New Golden Gate Ferryboats

Three Wooden Double-End, Diesel-Electric Auto Ferries Being Built by the General Engineering & Drydock Company of San Francisco for the Golden Gate Ferry Company

As announced in the October issue of Pacific Marine Review, three new diesel-electric, double-end screw automobile ferries have been ordered by the Golden Gate Ferry Company from the General Engineering & Drydock Company, both of San Francisco. These ferries will be of wooden construction and will be along the same general lines as the ferryboat Golden State recently delivered to the Golden Gate Ferry Company by the General Engineering & Drydock Company. There are some changes, as will be readily seen by comparing the profiles and plans illustrating this article with those published in July of this year in Pacific Marine Review.

These boats will be operated on the San Francisco-Sausalito and the San Francisco-Berkeley runs of the Golden Gate Ferry Company.

The principal characteristics of these ferries are:

Length over-all	240′ 0″
Beam, molded at deck	44′ 0″
Beam, over guards	60′ 0″
Depth, molded	17′ 0″
Speed, light, knots	13.5
Speed, loaded, knots	13
Capacity in automobiles	85
Seating capacity for passengers	350
Seating capacity in restaurant	75

These ferries are designed mainly for the transfer of automobiles and the main deck is made as free from structural obstructions as is possible consistent with strength. The body of the hull and the main deck form a structural unit which is stiffened by two heavy longitudinal trusses. The top and bottom chords of these trusses are of heavy Douglas fir timber and the transverse members of structural steel. These trusses are continuous through the hold from one collision bulkhead to the other, and in conjunction with the sturdy structural timbers of the hull form a stiff foundation adequately calculated to absorb and distribute all stresses due to propulsion, loading, and flotation.

On top of this hull is to be erected a house of two decks. The saloon deck is built so as to give 12 feet 6 inches clearance, ample for all ordinary truckloads. On the saloon deck are located the restaurant, smoking room, ladies' rest room, public seating, galley, lavatories, and crew's quarters.

The Golden Gate Ferry Company is to be congratulated for pioneering the diesel-electric propulsion for ferryboats on San Francisco Bay. With three in operation, three building, and a steamer being converted to geared diesel drive, this company is in a fair way to a 100 per cent diesel fleet.

The Power Plant

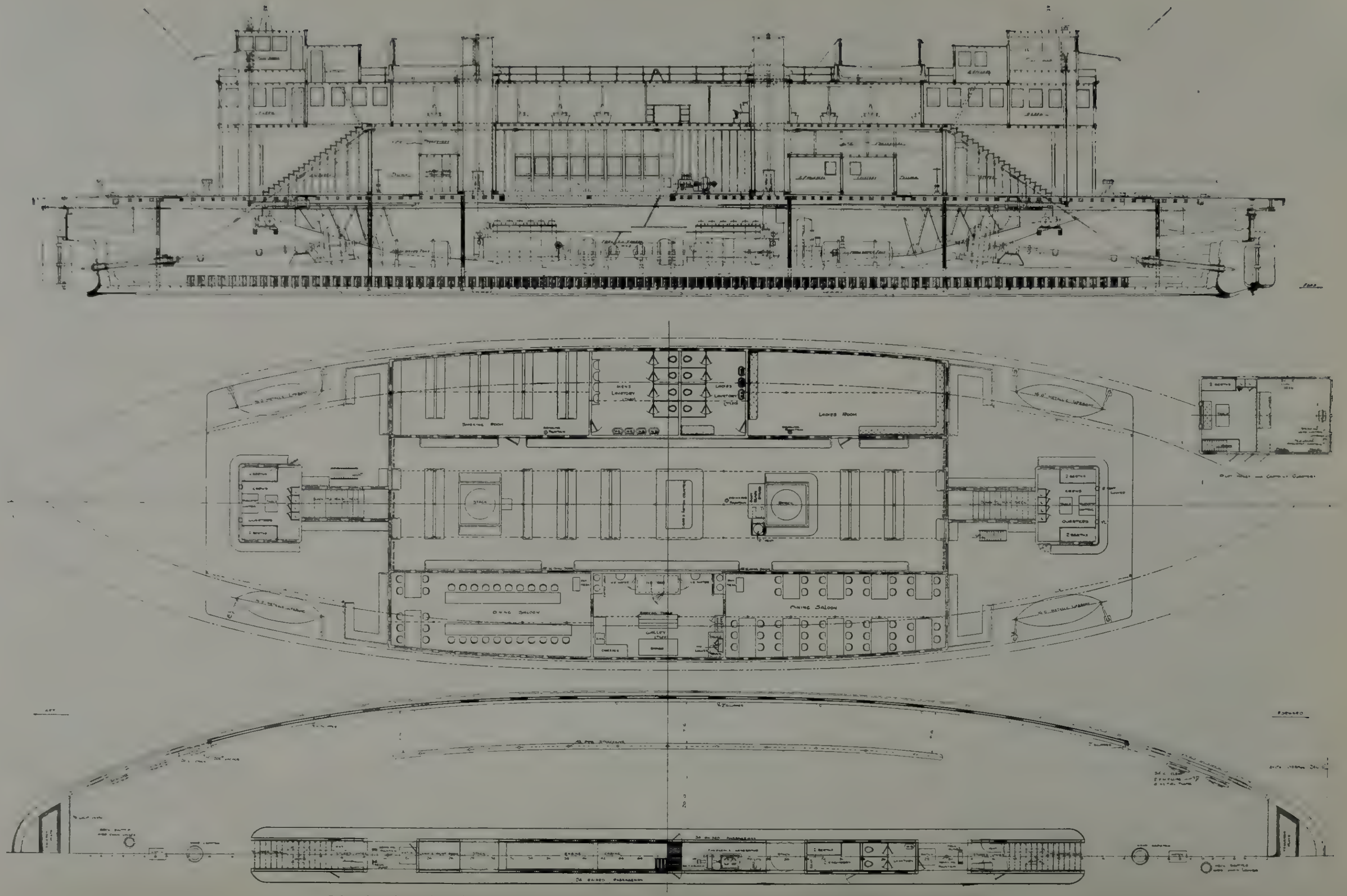
The power plant for these ferries is to consist of three 400 brake horsepower at 265 revolutions a minute, 6-cylinder, 4-cycle, solid injection type Ingersoll-Rand, nonreversible diesel engines, each directly connected to a 275 kilowatt, 250 volt Westinghouse direct current generator and exciter. The engines are 14-inch cylinder bore and 19-inch piston stroke. These generators operate in series and deliver current to the switch board at 750 volts. Each boat has two propellers, one at each end, and each propeller will be driven independently by a 950-horsepower Westinghouse motor. These two motors are each of sufficient capacity to drive the boat at full speed and operate in parallel differentially as described under the subhead "Electric Machinery."

Main Engines

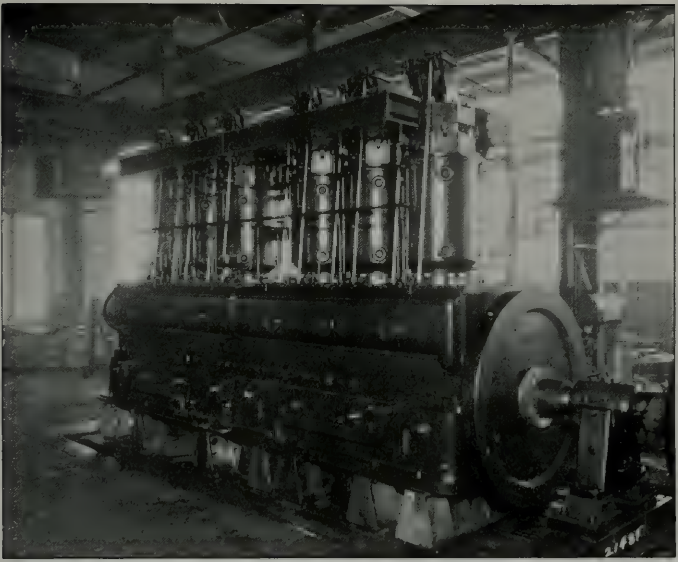
Since this application is the first marine installation of Ingersoll-Rand diesel engines on the Pacific Coast, a more detailed description will be of interest.

This engine is of simple, sturdy design, consisting mainly of a heavy base carrying a housing, upon which are mounted the cylinders with their heads and manifolds. The base is of heavy construction and of exceedingly simple design. It is strongly reinforced by ribs. Broad flanges give ample bearing surface on the foundation. This base also acts as a sump for lubricating oil.

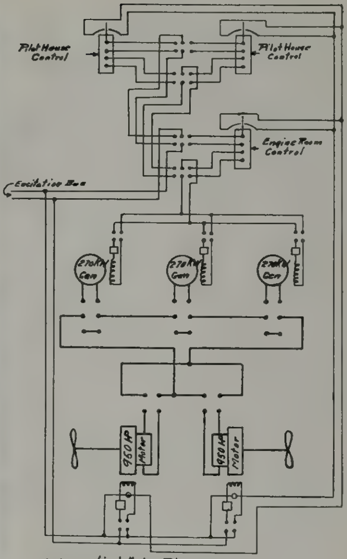
The housing, which is of cast iron, is heavily ribbed, flanged and bolted to the base with studs. The cylinders are mounted on the housing, bolted thereto by studs. Tie rods connect the cylinder to the base plate. These rods are designed to relieve the housing of all tension strains and transmit them to the base. In one side of the housing is mounted the side shaft, driven by gear from the crank shaft. The side shaft carries the valve eccentrics, fuel injection pump cam, air starting cam, governor gear, and distributor gear. It is supported on full babbitted bearings, which rest on adjustable pads. Removable doors are placed on the back of the housing.



Inboard profile, saloon deck plan, and half plan of main deck of the new Golden Gate diesel-electric automobile ferries.



View showing a 6-cylinder 400-horsepower Ingersoll-Rand, nonreversible, P.R. type diesel on the test stand. This picture gives a very good idea of the simple, straight line construction and sturdy strength of this economical prime mover.



Schematic Wiring Diagram For Golden Gate Ferries

This permits easy inspection or adjustment of the driving parts. Suitable coverings are bolted to the front of housing. These coverings are easily removed by means of swinging hooks, trolleys, and side rails, affording quick inspection of side shaft and its complements.

One of the special features of Ingersoll-Rand diesel engine practice is the provision for adjustment of all bearings. The lower halves of the main crank shaft bearings are carried on heavy wedges which are adjustable by means of wedge bolts from the outside of the base casting. The crank pin and wrist pin bearings are also adjustable by wedge bolts.

The fuel injection system is very simple, positive, and reliable in its operation. Oil flows by gravity from an elevated engine room service tank to the injection pump on the engine. This pump, bolted to top of housing, consists of a cast iron frame, holding a steel pump barrel, in which a pump plunger ground and lapped to a perfect fit works without packing. This plunger is operated through a roller bearing on a cam on the side shaft and is held to close contact with this cam by a strong spring. The cam has a lift for each cylinder of the engine. This pump forces the oil into an oil distributor which acts as a leak-proof device for directing the fuel charge to the particular cylinder which is ready to receive it. From the distributor there is a pipe line to each cylinder dividing at the cylinder head to pass half the fuel to each of the injection nozzles.

Cylinder heads of the Ingersoll-Rand P. R. engines are made in two parts, each of which has large free cooling water passages. The upper head carries the inlet and exhaust valves, and the lower head accommodates the two diametrically opposed fuel spray valves and the air starting valve. Cylinder and cylinder liner are cast in one piece with unusually large cooling water space and large provision of clean-out holes. Cooling water is carried from cylinder to lower and upper head by outside connections, thus allowing a ground metal-to-metal joint between these pieces and doing away with all gaskets.

This type of engine for electric drive is now in successful operation on many marine jobs, including tugs for the Long Island Railway, tugs and tankers for the Atlantic Refining Company, and tugs for the Panama Canal Commission.

Electrical Machinery

The electrical machinery for the new Golden Gate ferries, being manufactured by the Westinghouse Electric & Manufacturing Company, will be built in accordance with the most modern design, both propelling and auxiliary equipment being designed and built particularly for the exacting requirements of marine service.

The main propelling machinery for each boat consists of the following:

Two 950-horsepower, 750-volt, 150-100 r.p.m., single armature, separately excited, shunt-wound, direct current, main propelling motors with forged flanged shaft, pedestal type bearings and bedplate.

Three 270-kilowatt, 250-volt, 265 r.p.m., direct current, main generators with differential series and separately excited shunt fields.

Three 40-kilowatt, 115-volt, 265 r.p.m., compound wound exciters.

One complete switching and control equipment with engine room and double pilot house control stations.

The propelling motors will be coupled directly to the propeller shafts, each equipped with a Kingsbury thrust bearing.

The main switchboard will be located in the engine room and will carry all instruments, field rheostats, switches, circuit breakers, and bus bars for the propelling equipment and, in addition, the main controller for the engine room control station.

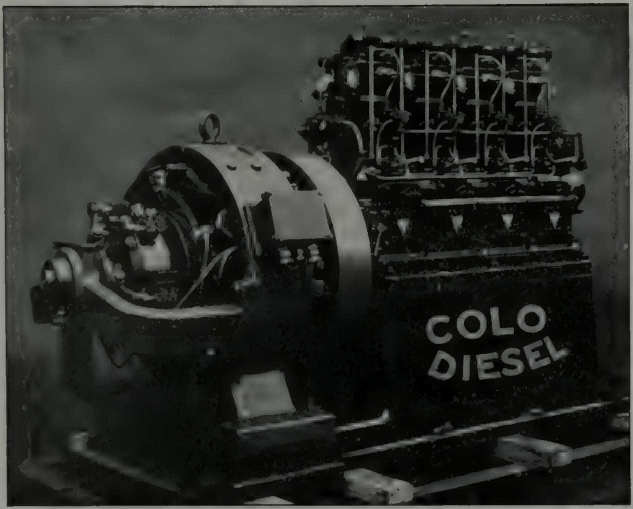
Control System

Since these ferries are of the double ended type, two pilot houses are required, each provided with a control station for the main propelling equipment, so that irrespective of the direction of travel the complete control of the ship is in the pilot's hands.

The accompanying diagram indicates the double pilot house and engine room control stations and the main power connections. It will be noted that the three main generators are connected in series, while the propelling motors are connected in parallel. All control of the propelling machinery is accomplished by manipulating only the main generator fields. It will be readily understood that, with the main controller in the off position and no field current applied to the main generators, no power will be applied to the propelling motors. A forward motion of the control handle causes current in the generator fields, so that the resulting power provides ahead rotation of the propelling motors.

Since the propelling motor fields are shunt wound and separately excited, the speed and direction of rotation depends upon the direction and magnitude of the power applied to these armatures, which in turn is controlled by the generator field excitation as applied through the main controller.

The main controllers are provided with auxiliary contacts, which so regulate the motor fields that the forward motor will operate at a stronger field and therefore a slower speed than the after motor. This difference in speed between the bow and stern screws being so porportioned the after motor carries all the propelling load, the bow propeller turning at practically zero slip speed. This system has proved very efficient because the vessel will not be required to run against the wake of the bow screw. This feature is practical only with electric drive and, coupled with the high efficiency of the diesel electric system and the safety and ease of operation inherent in the pilot house control system, has been the deciding factor in the selection of the machinery for these boats.



4-cylinder, 35 horsepower Colo diesel, direct connected to a direct current generator. A set similar to this will be installed on each of the three Golden Gate ferryboats for emergency light and power.

The excitation load will be carried by one of the three exciters and the auxiliary power and lighting load will be divided between the other two exciters.

All auxiliary motors will be of the Westinghouse enclosed, self ventilated type, developed especially for marine service and controlled by enclosed marine type magnetically operated controllers. These motors will drive the fire and bilge pump, fresh water pump, fuel oil pump and double steering gears.

All auxiliary motors are equipped with the Westinghouse sealed sleeve, ring oiled bearings which have been so perfected as to require attention only once or twice a year. The construction of these bearings is such that dirt and water are excluded and the leakage of oil prevented, insuring at all times an ample supply of clean oil to the bearing surfaces.

The ships will be electrically heated throughout by the latest enclosed marine type heaters, arranged for low, medium, and high heat.

Each of the three boats will have following pump auxiliaries:

Two fire and general service pump units; each consisting of one Northern rotary pump, with all bronze head, capacity 180 gallons per minute against a discharge pressure of 100 pounds, pump to be mounted on a unit cast iron base with and driven through a flexible coupling by a 10-horsepower, 1200/850 r.p.m. variable speed, direct current, 115 volt, Westinghouse motor equipped with magnetic starter and field control.

Two sanitary pump units, each consisting of one Northern rotary pump, with all bronze head, capacity 50 gallons per minute against a discharge pressure of 30 pounds, pump to be mounted on a unit cast iron base with and driven through a flexible coupling by a 2-horsepower, 1180 r.p.m., 115 volt, direct current, marine type Westinghouse motor with magnetic starter.

Two bilge pump units, each consisting of one Northern rotary pump, with all bronze head, capacity 50 gallons per minute against a discharge pressure of 30 pounds, pump to be mounted on a unit cast iron base with and driven through a flexible coupling by a 2-horsepower, 1180 r.p.m., 115 volt, direct current, marine type Westinghouse motor.

Two oil transfer pump units, each consisting of one Northern rotary pump, with all bronze head, capacity 15 gallons per minute against a discharge pressure of 30 pounds, pump to be mounted on a unit cast iron base with and driven through a flexible coupling by a 1-horsepower, 1140 r.p.m., 115 volt, direct current, marine type Westinghouse motor.

All of this equipment will be furnished by King-Knight Company who furnished the same equipment for the Golden State.

Each boat will be equipped with one 25-kilowatt, direct current, emergency auxiliary, marine type Westinghouse generator driven directly by a Colo 4-cylinder, 4-cycle, airless injection, hand starting diesel engine of 32-horsepower. This engine is furnished by F. van Rossen Hoogendyke of San Francisco, sole distributor of this engine for the United States. The engine has a cylinder bore of 4.821 inches, a stroke of 7.087 inches, and delivers its rated power at 700 r.p.m. Weight complete is quoted at 843 pounds.

American Ships for American Goods

Abstract of a Paper Read Before the Shipping Conference Held in San Francisco by Philip S. Teller and Jefferson Myers, United States Shipping Board Commissioners

By J. C. Rohlfs, Vice-President, Pacific American Steamship Association

IN speaking on such an important matter as an American merchant marine I do not deem it wise to speak off hand for fear of misstatement or forgetfulness of some of the essentials. I am therefore reading this paper so that it may then be placed in the hands of these gentlemen, Honorable Commissioners of the United States Shipping Board. Remarks hereafter set forth are my own personal opinions as gathered from twenty-eight years of experience in designing, building, and operating river, bay, and ocean going craft of every description except passenger.

Of greatest and first importance to my mind is the maintenance of an adequate merchant marine as an indispensable aid in time of national emergency. Our coasts must be protected from invasion and, in case we are again called upon, we must be able to act aggressively. I do not fear land disarmament, for we have the man power, but I do fear sea disarmament. With naval disarmament complete the nation with the largest merchant marine has at its immediate disposition the largest navy. At the beginning of the last war we had a navy but were forced to rely on foreign ships to supply the fighting vessels with the necessary fuel, stores, etc. We do not crave trouble, we do not seek that which does not belong to us, but we may again be drawn into the maelstrom. History corroborates the statement that when two nations go to war they usually involve others. We observe with thankful hearts the efforts to provide a permanent peace, but the development of effective machinery to bring this about seems far distant. We can, therefore, conclude that commercial ships are absolutely essential to our safety as a nation.

In what other directions is our nation interested in an American merchant marine? It is true that foreign nations are always willing to haul our imports and exports, but in time of emergency they are unavailable. That is what happened to us at the outbreak of the last world war. We had been relying almost entirely upon foreign ships to move our commerce, but upon the declaration of war these ships became subject to the war time orders of their respective governments and were almost entirely removed from our service. What was the result? Our government, our enterprises, and our shippers were dictated to as to what goods would be permitted to move, how and when, and exorbitant freight rates were charged and collected. And how did this affect the farmer and the manufacturer? Our surplus production, worth millions and millions of dollars, the products of our farmers, the merchandise of our factories, etc., piled up along our railroads, in our warehouses, and on our docks and wharves, deteriorating and spoiling for lack of ocean transportation facilities, all because of the prewar, and even today, short-sighted and neglectful attitude of our own people towards our merchant marine. I say our own people, because our representatives in Washington are subject to the dictation of the people when the people so desire. One of the objects of these gentlemen from Washington who are with us today is to get the American people as a whole interested in the merchant marine. The shipowners know the problem and have offered constructive suggestions, practically all of which have so far been rejected by our legislative bodies, because the farmer, the manufacturer, and the main body of our people have not understood and do not now understand exactly what the lack of an American merchant marine means first to the nation and secondly to them. This lack of interest to my mind is comparable to the lack of interest on the part of voters in failing to register and vote for competent representatives to further the good of the nation.

Reverting again to the farmer and the manufacturer to whom the shipping interests must look for support. Our surplus products, the result of manufacture and agriculture, are in competition with these same products of other nations. Can we then be dependent on the vessels of other nations to carry them? We cannot and should not. The control of transportation is a powerful weapon and those nations who possess surplus transportation in time of keen competition and slack demand can place the exports of a nonshipowning nation at a disadvantage.

Before the world war only 9 per cent of our exports and imports was carried in American-owned vessels. The greater part of our tonnage was owned by large American corporations able to at least give their ships outward cargoes. It is fair and reasonable that a nation should carry at least 50 per cent of its exports and imports in its own ships. This is simply insurance against catastrophe, and the principle of insurance is recognized all over the world as a sound one. We should not make our nation and its commerce dependent upon competitors for carriage. Our pre-war status and the cost thereof should not be forgotten. We must have some workable plan which will keep the American flag on the seas in foreign trade. It must be made profitable in order to attract American capital investment.

The most intensive study is being given this subject by the Shipping Board and that is why we are here today to meet these gentlemen representing the Board. They want to know what the trouble is, and then what remedial suggestions we have to offer. We must in this discussion forget for a moment that some American shipowners have acquired good tonnage very cheap from the government. That opportunity will soon be gone and we must then face normal conditions. In prewar normal times and in normal times to come (unless aids through legislation are soon forthcoming) American ships will again face those oft stated and admitted handicaps; viz., greater capital investment with resultant higher interest charges, higher depreciation, and higher insurance premiums, together with larger crews, higher living scale and wages, 50 per cent duty on repairs made in foreign ports, resulting in higher repair costs, burdensome and expensive inspection laws, numerous pay-days in foreign ports with a consequent lack of discipline and innumerable government fines. The American ship measurement system places a handicap on an American ship through higher Canal tolls, higher dry-dock and port charges. The burdensome and unnecessary provisions of the Seamen's Act should be eliminated. On top of all these the American shipowner must compete with the subsidies granted by other nationals to their competing ships.

Now as to our government itself in its treatment of an American vessel arriving, say, at the port of San Francisco from a foreign port: The Public Health Service (Treasury Department), the United States Customs Inspectors (Treasury Department), the Immigration Inspectors (Department of Labor), the Shipping Commissioner (Department of Commerce), and sometimes the United States Steamboat Inspection Service (Department of Commerce) all, or severally, take control of the vessel on arrival. In addition to all this, if the vessel arrives from the Hawaiian Islands, or even from our mainland state of Florida, the California State Department of Agriculture representative, the Horticultural Inspectors, will not let the ship leave quarantine until he is satisfied that no citrus fruit aboard is contaminated by a "bug." This situation may be likened to a workman taking orders from five or six bosses. The attentions bestowed on this vessel, however, are limited to certain hours; viz., between sunrise and sunset. If the vessel arrives before sunrise it must wait; if it arrives after sunset, it must wait until the next morning and the passengers and cargo must remain aboard. It is no wonder that sea passengers complain of government red tape. Now in the month of December, the sun rises as late as 7:25 and sets as early as 4:51, truly a short day. This appears to me to be an obsolete custom. International train service is not handicapped by such restrictions. Passengers and freight trains crossing our border to and from Canada, for example, are not delayed. Customs service is rendered day or night. It seems to me that a consolidation of these departments, together with a day and night service would cheapen operating costs and make ocean passenger transportation more attractive. It would also prove helpful if the office hours of the above mentioned departments conformed in general to the business hours of the shipping community, say from 9 a.m. until 5 p.m., with skeleton organizations for Saturdays, Sundays, and holidays, giving such workers additional compensation or time off for any overtime rendered.

United States vessels sailing for a foreign port and also sailing in the intercoastal trade are required to sign the crew on before a United States Shipping Commissioner. The law is inconsistent in this respect: that while it is not necessary to sail under register on an intercoastal voyage (which is really coastwise transportation) it is required that the crew sign on articles before a shipping commissioner as on foreign voyages. When signing on has been accomplished to the satisfaction of the shipping commissioner, the articles are then presented to the Custom House and clearance papers obtained. Because so many branches of the government have jurisdiction over the operation of American vessels, it is almost impossible and extremely unwise for the average steamship company to look after the entrance and clearance of their vessels without the help of a broker (a Custom House lawyer) who is constantly on the ground and in a position to keep up on the latest rulings and regulations of the several departments. This seems unnecessary expense, yet it is the safest thing to do if a shipowner wants to avoid fines. To illustrate, the following papers are required by a vessel sailing from an American to a foreign port; viz., ship register, ship articles, certified crew list, port sanitary statement, fumigation certificate, receipt for alien crew list, and manifest. Should the master lose one of these documents he is in trouble. This multiplicity of papers results from the fact that several departments of the government deal with the vessel. I believe that the various documents could be reduced to one or two.

The above constitute in the main what may be termed the shipowners' troubles. The Shipping Board members honoring us with their presence today desire to know what can be done about it. They want constructive suggestions to add to many others now being obtained by the eastern members of the Board. From all the data so received it is hoped something beneficial to the merchant marine will result.

May I therefore recommend—

1. **Shipping Board Merchant Marine Bill:** That the Shipping Board prepare a bill dealing with this subject for introduction in Congress. Before such a bill is presented, however, it is recommended that the Shipping Board and the shipowners have final meetings with the object of reaching a complete agreement. When such a bill is presented to the congressional committees, there should be no discord.

2. **Shipowner Data Heretofore Filed with the Government and the Shipping Board:** Data on the shipowner troubles, together with suggested remedies, are set forth in greater detail in the Shipowner Association pamphlet dated May 9, 1925, copies of which have been filed with the Board. If not available, others can be obtained from the American Steamship Owners Association, 11 Broadway, New York. Further information and suggestions on the same subject may be procured from the United States Chamber of Commerce in a pamphlet entitled "National Merchant Marine Conference held under the auspices of Chamber of Commerce of the United States, composed of representatives of commerce, industry, agriculture, labor, finance, insurance, ship building and ship operation."

In confirmation of the above statements, which are based on my experience, I respectfully refer the Shipping Board to its own files on ship operation. I am sure that the Board's experience as reflected in its files will prove of value in finding that which is sought. I believe the records would show that an American built and owned ship cannot exist in foreign trade without aid of some description. Careful study of the data now available should enable the Board to outline what aids are necessary.

3. **Navigation Laws:** It is recommended that the Shipping Board revise and bring up to date the navigation laws, relegating to the scrap heap such laws as are obsolete or unnecessarily burdensome. The legal department of the Board his been working on this matter for several years. It is a tremendous undertaking. Copies of its findings so far have been given to the shipowners associations for criticism. The work is so voluminous that no private shipowner can give it the proper attention. I would suggest that when the Board has completed its work along these lines, the shipowner associations undertake the problem of review, regardless of time or expense. However, when that time arrives, the shipowners must ask the Board to extend

reasonable time. A work on which the Board has spent several years through a special department cannot be properly reviewed and criticised in a couple of months.

4. Consolidation of Government Departments Dealing with Ships on Arrival and Departure: Shipowners would benefit materially through decreased delays and operating expense if the following departments were consolidated: Public Health, Customs, Immigration, Shipping Commissioner, and U.S. Steamboat Inspection Service.

The present methods employed by these departments, all of which deal separately with American ships, should be studied with a view of simplifying procedure and eliminating that which is unnecessary and burdensome. Such a revision of governmental administration would cut down the number of clearance documents required. This matter might well be reviewed at the time the Shipping Board calls a conference with the shipowners in Washington for the final review of proposed legislation. The rulings of the representatives in charge are sometimes quite severe. They live up to the letter of the law and not the spirit. As an example: The tank steamship W. S. Miller on a voyage from San Pedro to New York arrived at Cristobal, Panama Canal, at 11:45 p.m., August 29. The master was ordered by the doctor to place the ship's steward in a hospital ashore as he was threatened with pneumonia. It was necessary to pay the steward off, but according to the rules this had to be done before a United States Shipping Commissioner. Said commissioner was not available until office hours the next morning. The master himself signed the man off to avoid delay to the ship and sailed at 1:15 a.m. The master gave the steward's wages to the ship's agent, who in turn was to give same to the Shipping Commissioner in the morning. This was attempted, but the Shipping Commissioner refused to pay the man. After the steward was discharged from the Colon hospital he was placed in a hotel to be held until the vessel's return, at which time the Shipping Commissioner ordered that he be signed on again in his original capacity. The ship in the meantime had hired another steward in New York. On arrival at the Canal the Shipping Commissioner ordered the old steward aboard for reemployment and return passage to San Pedro. The steward will therefore make claim for wages from the date he left the ship at Cristobal until he reaches San Pedro. The rule of the Shipping Commissioner's Department really required the ship to wait until next morning (a truly needless delay), but to my mind, under the circumstances, the Shipping Commissioner might well have O.K.'d this entire matter under the doctrine of emergency. Therefore, I say that the rules of the various government departments dealing with shipping are not sufficiently elastic. They do not allow the use of personal judgment in emergency cases on the part of representatives stationed in outports.

5. Government Ship Fines: It is recommended that the Treasury Department investigate the subject of ship fines. They are entirely too numerous and unreasonable. A shipowner should be relieved from penalty for smuggling by the crew, officers, or master, provided the owner can show that he has exercised reasonable care to engage a competent master and crew. It is unfair to punish a shipowner when he cannot control the personnel aboard his ship in a foreign port. It should be understood that the officers and engineers aboard American ships are semi-government officials. For wrongful conduct the United States Government can take away their livelihood through cancellation of licenses; in fact, the shipowner is limited by law to his employment of these licensed government men with certificates of competency and good moral character. Even the unlicensed personnel have government certificates; viz., A.B. certificates and lifeboat certificates subject to cancellation for bad conduct. I have tried to point out that after an American ship leaves the home port she is really in charge of licensed semi-Government officials and crew, and therefore any punishment in order should be placed with the violator. Relief from unreasonable fines would be some aid to those American shipowners who can prove innocence through due diligence and the use of all reasonable precautions at their command.

6. Seamen's Act: The Seamen's Act, in some respects a salutary measure, has proved detrimental to efficient operation of American ships in the foreign trade, and I venture to say that the personnel records of the Emergency Fleet Corporation will bear out this statement. The records of the private shipowners certainly show this to be the case. The act should be amended to correct abuses and reduce the unnecessary burdens imposed upon shipowners which are working against successful operation of American ships. The shipowners' recommendations on this subject, dated May 9, 1925, point out what these abuses are and how they may be corrected.

7. Admeasurement: There should be but one admeasurement system for vessels in the United States. At present there are two; one for the vessel to first secure its register and the other for Panama Canal transit. American admeasurement rules should not place American ships at a disadvantage with foreign ships in transiting canals and in determining drydocking and port charges. The technical men of the Shipping Board should investigate this feature.

8. Panama Canal: The Panama Canal tolls should be revised downward. This Canal was built at government expense primarily to facilitate the movement of naval vessels from coast to coast, and, secondarily, to provide a shorter and cheaper means of transit between the United States Atlantic and Pacific Coast ports. It is showing great profits taken supposedly from the pockets of the shipowner, but really from the people who pay the freight rates. Furthermore full tolls should not be charged on partly loaded ships. The Panama Canal is now operating only 16 hours per day. At one time it operated 24 hours. The result is that many ships are delayed. The reason for this I believe to be economical operation at the expense of the public.

9. Government Shipping Competition: The government should not engage in the shipping business, at least not in competition with the private American owner. The government should discontinue the corriage of government supplies or transfer of troops in times of peace in government ships, at a cost greater than the same service by privately owned American ships. American ships should be patronized by all government officials and employes where traveling on government business at government expense. Therefore, the army and navy transport service should be abandoned, also the Panama Railroad Steamship Line. This would be a material aid to the American shipowner.

10. Quarantine and Fumigation: Quarantine stations in many American ports are inadequate and contribute to delays and increased cost of operating American ships. It is recommended that the Health Department of the government investigate this matter and make whatever recommendations necessary for its correction. The shipowners associations will be glad to cooperate. Insufficient fumigation facilities also entail delay and expense to ships, and fumigation by competent private companies under supervision and regulations prescribed by the Public Health Service might save the shipowners some time and money.

11. New Ship Construction: There can be no hope of a permanent merchant marine without provision being made for the replacement of worn out or obsolete tonnage with new tonnage of the latest type to meet the greater competition which is making itself felt as a result of the replacement of steam power with diesel and diesel-electric drive. The shipowners believe that the government should aid in the construction of new tonnage in American shipyards. This would serve the double purpose of keeping our merchant marine up to date and also provide work for our shipyards. The shipbuilding art should not be allowed to die, nor should we lose our skilled shipbuilding craftsmen. The Shipping Board should evolve some workable plan on this matter. A suggested method is proposed in the shipowners recommendations dated May 9, 1925, to which I respectfully refer you.

12. Classification Societies: There should be greater reciprocity among maritime nations in the matter of recognition of ship classification societies. It is suggested that perhaps the International Chamber of Commerce might be constituted the agency to bring this about. I refer here only to classification societies which have the approval and sanction of their respective governments. A maritime nation of our extent should have and foster its own classification society and that society should be placed on a par with all others. In the past, before a private American shipowner could build a vessel and have it insured, it was necessary for him to have his plans and specifications approved by some foreign society. Under a plan such as that we would disclose to our competitors every advancement that we might originate in the art of shipbuilding.

13. Maritime Workman's Compensation Act: The shipowners believe in a federal workman's compensation act which will apply to all men employed aboard ships. It is an accepted principle in all lines of industry that an industry should carry the burden of losses to its workmen and their dependents, arising through personal injuries and death suffered in the course of employment. It is recommended that the Shipping Board endorse the principle of compensation to maritime employees and that it lend its aid to the passage of an appropriate act.

14. Depreciation Charges: Although the Internal Revenue Act of 1921 allowed shipowners a deduction from taxable profits for the amortization of vessels acquired for war purposes, many owners had ships constructed during the period of the war or immediately thereafter, which did not come within the technical regulations laid down by the Bureau of Internal Revenue permitting such amortization. These vessels were acquired at extremely high prices and the owners are now greatly handicapped by fixed charges necessary to cover interest, depreciation and insurance. It is recommended that the Shipping Board endeavor to have the Bureau of Internal Revenue secure legislation which will permit shipowners to write down the abnormal cost of such vessels to their present day replacement cost after making proper allowance for depreciation resulting from age. The shipowners should be allowed to deduct from taxable profits the amount thus written down. Adjustment of capital investment along these lines would set up equitable valuations and materially reduce the troublesome fixed charges on presently owned ships.

15. Direct Aids: All of the recommendations heretofore made may be termed indirect aids. If all of them were adopted, however, they would still be insufficient to entirely remove the disabilities of American ships operating in foreign trade, but the greater the indirect aids extended the less will be the direct aids required. The American tonnage in the foreign trade today cannot be termed tramp tonnage, as practically all those ships are assigned to certain trade routes. Some of these trade services will show greater losses than others yet all may be deemed essential services for the prosperity of our nation, and therefore necessary to maintain. Some may not show any losses due to the fact that certain lines have acquired Shipping Board tonnage at such low costs, that their small overhead for fixed charges may be of sufficient aid to enable them to compete and show a fair return on the investment. Direct aids, therefore, should only be given to ships in essential trades to the extent necessary to make their operations commercially successful. The shipowner should not enrich himself at the government's expense.

One direct aid would be liberal compensation for the carriage of mail and, another, cash payments by the government to the owners of ships to meet proved losses. The compensation paid should be of sufficient amount to maintain each particular trade. It should be based on the tonnage and speed of the ships necessary to give adequate service with due regard to the nature of the competition to be met in such trade and to the importance of the service from a national standpoint. Such direct assistance will not be colossal. It will be much less than the present day losses of the government in the shipping business. Such direct compensation has been roughly estimated to be between twelve to fifteen million dollars per annum, amounting to a few cents annual tax per person in the United States. I ask, is that too much to pay for national security and commercial independence?

16. Disposition of Laid-up Vessels: It is unbusinesslike and a waste of public monies to continue to care for the laid up ships of the government's fleet which have no present or prospective value as commercially successful instruments of commerce. These ships should be scrapped in America and as much salvage recovered therefrom as is possible. They should be written off as war expense. I regard with disfavor the sale of vessels to foreign buyers either for scrapping or for restricted uses. Such sales would result in cheap steel which might go into the construction of foreign ships which would later be used to compete with us. They might also result in using the smaller vessels for foreign feeder services to assist in the operation of the larger foreign steamship services in competition.

17. Government in Business: The shipowners stand as a unit in opposition to our government engaging in private business and stand emphatically on the introductory statement (which is now law) of the Merchant Marine Act of 1920.

Protection of Cargo

By Norman F. Titus, Chief, Transportation Division, Bureau of Foreign and Domestic Commerce.

DURING the past eighteen months, delegations and commissions from Europe have arrived in this country to study our industrial methods. Their purpose has been to ascertain how we could pay the highest real wages in the world and still compete with other nations in the world's markets. They imagined that a careful analysis of our methods might disclose some economic trick which could be put into operation in Europe and thus combat our increasing ascendency in the world's business.

Most of the investigators have returned to their native lands and reported their findings. Irrespective of the results of their analyses, the fact remains that their visits were a frank recognition of our industrial supremacy; this supremacy is based upon original methods, most of which are distinctively American. Furthermore, the shelves of every library are burdened with books dealing with the subject of American industrial methods. We find our educational and social systems analyzed as to their effects upon our industrial progress; books without number upon mass production, refinements of methods and machinery, discussions of the human element in business, elimination of waste, scientific management, employee representation, safety engineering, cost accounting, and many allied subjects.

Is it not strange, with the evidences of industrial success so obvious and with such an extensive literature on the subject, coupled with a recognition of these facts by other countries to such an extent that they send commissions over to analyze our success, that shipowners and operators seem to be utterly oblivious of the possibilities of the situation? Apparently it has never occurred to the shipping fraternity that possibly some of their problems have been solved by their brother industrial executives in a conspicuous way. As a matter of fact, industry has achieved success in many lines that seem to be unknown in the shipping business. Certainly, the hour is at hand for the shipowner to take a leaf, or several leaves, out of the book of experience of the industrialist.

Room for Improvement.

Practically every element in shipping is capable of tremendous improvement, but, for the purpose of this article, let us take one of the more obvious ones—the matter of freight protection. Freight protection is the correct and more diplomatic expression for what was formerly referred to as claim prevention. The question, therefore may be stated in another way, as—What are shipowners doing to protect cargo and cut down or eliminate claims?

While it is true that a decided improvement is at present manifest over war-time conditions, nevertheless the improvement is due principally to getting away from hectic war-time operations and returning to normalcy, rather than to any refinement of methods on the part of the shipowner. As a matter of fact, the American shipowner has made practically no effort to scientifically study his stowage problems and methods of freight handling. Any efforts that he has exerted have been mainly to expedite the settling of claims, an effort praiseworthy in itself, but an effort that ignores the causes of the losses.

To this day, cargo losses in American ships are enormous and cover every phase of cargo handling. This was pertinently illustrated by the statement made October 1, 1925, at the Fourteenth Annual Congress of the National Safety Council, Cleveland, Ohio, by Irving L. Evans, vice-president of the United States Protection and Indemnity Agency. He read a table showing the number and nature of claims settled by his company during the fiscal year ending June 30, 1925. This table disclosed that the total amount of claims paid was $1,464,646.84; of this amount 22.08 per cent was for cargo damage, 31.9 per cent for cargo shortage, and 1.77 per cent for cargo pilferage, the balance for personal injury and miscellaneous losses. Particular attention should be paid to the inexcusably large percentage for cargo shortage. It is a matter of common knowledge among shippers that mistakes of almost criminal carelessness occur repeatedly with apparently no remedy applied.

An Incredible Example.

It is difficult for the layman to visualize the state of management in a steamship concern that operated a vessel that arrived at a Pacific Coast port not so very long ago. This vessel was obliged to pass through the tropics and transported a cargo consisting mainly of scrap iron, tallow in second-hand barrels, coffee in sacks, and cases of Victrolas. Incredible as it may seem, the scrap iron was stowed upon the cases of Victrolas and the tallow upon the coffee. The result was that, due to the heat of the tropics the tallow melted and permeated the coffee; also, a storm was encountered and, due to the pitching and rolling of the vessel, the scrap iron shattered the Victrolas. This incident clearly illustrates the urgent necessity for the introduction of scientific methods into the shipping business.

But what of industry? In what way can it offer a solution of shipping problems of freight protection? Let us examine the case of the American railroads.

Railroads Show the Way.

Up to 1920 the railroads blundered along in much the same fashion as we now find shipping. In that year a definite and unified effort was launched by the railroads to ascertain the causes of loss, damage, and shortage of freight and to apply remedies. This work was inaugurated through the instrumentality of what is now known as the Freight Claim Division of the American Railroad Association. The success of this effort can be readily grasped by the showing of the following figures of total of claims on American railroads:

1920	$119,833,000
1921	92,276,000
1922	48,084,000
1923	47,479,000
1924	45,975,000
1925	36,760,000

Obviously a revolution in freight handling must have been effected to obtain such astonishing results. Aside from these totals, which are quite convincing, the annual reports of the Freight Claim Division, disclose many other items of importance. For instance,—

Loss and damage claims in 1925 reduced to one-third of what they were in 1920.

Net saving, 1925 over 1920, $83,072,156.

Loss and damage reduced to smallest proportion of gross revenue ever attained.

Number of claims cut in half.

Seventy per cent of all claims settled within thirty days.

Eighty-two per cent of all claims settled within ninety days.

Number of unsettled claims at end of the year reduced from 542,393 in 1920 to 204,962 in 1925.

Several million claims handled annually by amicable settlement without recourse to any court. Legal proceedings resorted to in less than one-half of one per cent of total cases.

Cooperation established between shipper and carrier in abolishing the economic waste of bad packing, rough handling, and dishonesty.

One hundred thousand arrests made annually by railroad police.

Convictions obtained in ninety per cent of cases.

Scientific Freight Protection.

One of the outstanding features of this great campaign has been the work of the Protective Section of the Freight Claim Committee. The record of losses paid by the railroads for theft and robbing for the year 1925 showed the lowest figures on record, of $1,492,000. In 1920 losses from these causes reached the astounding total of $13,000,000. The significance of these figures can be noted by referring to the figures of the United States Protection and Indemnity Agency, mentioned early in this article, wherein it was disclosed that the shortage claims of the shipping they had handled exceeded the damage claims. Can it be doubted that corrective methods would be highly profitable in the shipping business?

The freight claim prevention efficiency campaign has been carried on with the express companies and similar results have been obtained in this field. In 1921 the American Railway Express Company paid out $13,000,000 on 781,000 claims presented. In 1925, $4,138,000 was paid out on 472,000 claims.

In all of this work, it should not be overlooked that one of the greatest benefits is the improvement of relations with the shipping public. The shipper is a customer, and no business can properly function or attain its full measure of success without the establishment of good will with its customers.

In the light of these brief statements of results in industry, can it be questioned that the ship operator and owner can learn much from his brother executives? If we are to have American maritime supremacy, we must have introduced into the shipping business those same elements of efficiency, economy, and elimination of waste as are found in industry. Then, and then only, can we hope to see America Mistress of the Seas.

American Seamen In Foreign Ports

ONE of the numerous suggestions that have been made for the elimination of operating burdens on American ships is the repeal of those provisions of law which require the master of an American vessel, when in foreign ports loading and discharging cargo, to pay seamen half their wages upon demand without any discretion on his part and regardless of the effect such advance might have with regard to the detention of the vessel. In and of itself this provision of law would not appear to cause any hardship to the shipowner, but in practical effect it adds to the difficulties of the shipowner and in a great many instances is detrimental to the seaman as well as his family.

When an American vessel arrives at a foreign port after a voyage of any considerable length (and the length of the voyage makes no difference so far as the law is concerned) it is but natural that members of the crew should desire some shore leave. It is also to be expected those seeking such leave would like to have in their possession a reasonable amount of funds, but, as in all walks of life, we find men of different temperaments and some who are likely to make such use of their time ashore as to cause the vessel no end of trouble, delay, and expense. Instances without number can be shown where seamen either fail to report back to their ship or join the vessel in a condition unfit for work. In such cases vessels are either delayed awaiting the return of the seamen or in obtaining men to take their places.

The vicious part of the law as it now stands is that it leaves the master of the vessel absolutely no discretion to deal with his men in accordance with their temperaments. If he refuses to advance them half their wages upon demand at all ports where the vessel loads or discharges cargo, then the seamen, under the law, may demand and must receive all of the wages due—in other words, must be paid off and discharged. Thus it will be seen the crew of a vessel in a foreign port cannot in any sense be controlled by the master thereof and the consequent delays and expenses incident thereto present an operating problem which is a great hardship to American owners and difficult for the lay mind to understand.

In engaging men to take the place of those who fail to return to their vessel, it is not always possible to obtain the right kind of men or to exercise the same care in the selection of men that would obtain at the home port, hence in many instances vessels become liable to fines in the sum of as much as $1000 in the case of each alien who may have assumed a seaman's status in an effort to gain illegal admission to the United States. Frequently the cumulative effect upon the vessel is considerable in time and money and presents one more disadvantage of operating under the American flag. In a desire to be kind and generous to seamen this government goes far beyond the practice of other maritime nations, with the result that our operating problems are increased to the extent that the men take unfair advantage of the ship while in foreign ports. There would be no objection to the payment of part of their wages, but there should be no requirement of law that this should be done except in the case of those men who have demonstrated at other ports that their conduct has been such as to warrant advances in funds.

The success in operation of a vessel to a large extent depends upon the ability of the master to operate it without delays and to keep the crew in proper condition to perform the duties for which they have been engaged. A law enacted upon the theory of giving better treatment to seamen, which, in fact produces the opposite in the case of many men, is worthy of reconsideration at the hands of Congress if America is to operate its vessels successfully in competition with those of other maritime nations.

(Bulletin No. 6, National Merchant Marine Association.)

Gentlemen of the Oceans

T. V. O'CONNOR, chairman of the United States Shipping board, at a luncheon given in his honor ◆ at the Carlton Hotel, London, on September 15, delivered a masterly address. The luncheon was attended by a group of men whose shipping and financial interests covered every trade and embraced every sea. Among the more noteworthy were the following:

Duke of Connaught, Duke of Northumberland, Duke of Sutherland, Lord Justice Merrivale, The Earl of Balfour, Viscount Lord Inchcape, Lord Kylsant, Lord Ritchie of Dundee, Honorable Lord Maclay, Lord Inverforth, Sir Alan Garrett Anderson, Sir Kenneth Anderson, Sir John Ellerman, Sir Thomas Royden, Sir Frederick Lewis, Sir Walter Runciman, Sir Ernest William Glover, Sir August Cayzer, Bart.; Sir John Latta, Sir Herbert A. Walker, Sir Charles Hipwood, Sir Phillip Cunliffe Lister, Sir Durton Chadwick, Sir Westcott Abell, Sir George Higgins, Sir Felix Poole, Sir John Biles, Sir John Esplen, Sir Joseph Isherwood, Sir William J. Noble, Sir William H. Raeburn, Sir James H. Warrack, Sir Halford Mackinder, Sir Bonnop Guthrie, Sir Charles Parsons, Vice-Admiral G. R. Mansell, Right Honorable T. P. O'Connor, the Right Honorable Walter Runciman, F. C. Allen, Walter Burnett, H. M. Cleminson, John Denholm, E. A. Eva, Harrison T. Hughes, Philip Runciman, Harold Sanderson, Major Gilbert Szlumper, H. R. Miller, H. B. G. Larkin, Herbert Scrutton, C. F. Torrey, R. D. Holt, March Turnbull, Benson Taylor, Eustace R. Pulbrook, J. Havelock Wilson, Charles Dewolf, Vincent Barnett, W. H. Patchell, Comm. Officiale Paolo Scerni, Frederick A. Sterling, C. S. Dorand, Honorable A. B. Houghton, Honorable Andrew W. Mellon, Honorable Horace Lee Washington, F. E. Powell, John Denholm, Gordon Selfridge, William Anderson, W. P. Fayre, Wilson, Cross, Daniel B. Grant, Captain Paul Grening, Captain W. F. Purdy, Captain Robert Dollar, Senator Walter E. Edge, Congressman Davenport, Tarlton Winchester, L. E. Anderson, G. B. Moore, J. E. Dockendorff, Harry Watson, John F. Petrie, J. L. Carozzi, E. J. Choloner.

To this gathering Mr. O'Connor addressed himself as follows:

Gentlemen of the Oceans: With every maritime nation promoting and in some way aiding its merchant marine, world shipping has become a matter of competition between nation and nation. People sometimes carry tales between nations, just as they carry tales among each other. It is safe to assume, therefore, that the ambitions of the United States with respect to its merchant marine have been misrepresented and confused upon this side of the water. The fact is that our established policy provides for a merchant marine large enough to carry only one-half of our own commerce. We do not concern ourselves with commerce-carrying between other nations of the world.

How much less could any nation aspire to, if it would adequately protect its farmer and its manufacturer, to say nothing of the national defense? It is gratifying to know that other nations have seen our position and accepted it in the same friendly manner as we accept and respect the needs and maritime advancement of other nations.

The question has sometimes been asked even in our own country, "Why does the government go into the shipping business?" The answer is simple. Because of our long dependency upon ships which other nations were good enough to send to our shores when we had none of our own, the private American shipowner is not now in a position to take up where he left off when America abandoned the sea.

Until our private owners are able to successfully negotiate the business of an American merchant marine the government itself will conduct this operation. It will be recognized that we are following closely the policy and the procedure of older nations which have consistently fostered their own shipping through direct and indirect aids.

We are bound as a nation to guarantee to our farmers and to our manufacturers transportation of their commodities under any and all conditions and at a reasonable rate. We cannot permit future disturbances in other parts of the world to put our cotton growers, our wheat growers, and our manufacturers in a position where they will be deprived of the ocean service to which they are entitled. There have been times when our docks were piled high with cotton and grain and other commodities. The world wanted to buy these commodities and America wanted to sell them, but there were no ships available for their transportation. Both the seller and the buyer suffered. This must never happen again.

I have frequently taken occasion in public addresses to Americans to mention the policy of foreign nations with respect to their ships. I have never mentioned the policy as a target for criticism, but always as a model to be copied.

Shipping Problems.

I should like now to call your attention to one or two present-day problems in the shipping business, the solution of which lies not with government but with shipowners—problems which cannot be solved by speeches or by flag waving but by the deliberate business judgment of the men familiar with conditions in ocean commerce.

When the shipowners of the world are ready, regardless of flag, to sit around a table and discuss present conditions upon the oceans, I wish to assure you that if invited we will be glad to take our place at the table.

There was a time within your memory and mine when a man's business ability was measured by his ability to stifle competition and drag his rival into the courts of bankruptcy. The rules of commercial conflict were briefly contained in the one word "Win." To slaughter the weak was the purpose of the strong. To do this, however, became more and more difficult on account of the increasing strength of the weak. A man who in other times would have been considered weak on account of his private financial resources was able to go to bankers who, if they believed in the man's industry and his integrity, would furnish him with the cash and the credit to make him strong.

Gradually, wise business men began to see that conflicts involved a waste which they were unable to stand. When strong business men respect the strength of their opponents and find that the battle will be of long duration, they begin to talk adjustment and seek to find a way in which they can have peace with a reasonable profit not endangered by ruinous competition. It is safe to say that most of the world's greatest industries have in the last generation made the discovery that their strength lies in a fair division of the trade, rather than a ruinous conflict for all of it. Business men are no longer willing to be sent to a hospital for the satisfaction of sending their rivals to the mortuary. No business can stand waste, and this self-evident truth is generally recognized upon the land.

Transportation Afloat vs. Transportation Ashore.

Let us examine for a moment some essential differences between the railroad business on land and the shipping business on the water; and when I say the railroads upon the land I mean England, America, the Continent, or any part of the world where industry is intelligently managed. In the first place, ships are common carriers and are in reality public utilities rendering general service to all of the industries of their respective flags and exacting therefor a reasonable compensation.

In our own country, railroads have been subjected more and more to government supervision through the Interstate Commerce Commission. The general testimony of business men is strongly in favor of this government supervision. When the railroads were going it alone in strenuous competition for passengers and freight it was not uncommon to see a freight car of 50 tons capacity rolling across our prairies carrying 10 tons. If there are many empty cars or cars partly filled, we have a waste which can be paid in only two ways—assessment of the stockholders with ultimate failure of the railroads, or an increased freight rate to industries with serious injury to industry. Government working hand in hand with the railroads has removed a great deal of this wasteful conflict, and no longer is a railroad compelled to furnish a car to some shipper who wishes to send a few crates of onions to the market. If a shipper wants a car he must take the whole car, unless the railroads are able by an assembly of freight to allot him space on a pro rata basis.

On the land, common carriers are monopolies and for the very reason that they are monopolies rates for transportation are limited by law. No intelligent government organization, be it city, state, nation or empire, will give to individuals a monopoly in transportation unless certain rate-making restrictions are imposed.

Shipping Wastes.

On the oceans, however, we have common carriers subject in a general way to good or bad legislation but not subject to the restrictions or prohibitions of other governments. Ships of various nations are still subject to the wasteful losses which long ago have disappeared from the industries of the land. Ships half empty are plying between the same ports carrying the same cargo at the same rates and at practically the same dates. Yet we are told that to offer any suggestion to remedy this waste we are interfering with that great law known as the law of supply and demand. One would think to hear some people talk that if all life upon this earth came to an end the law of supply and demand, like the law of gravity, would remain eternally.

The fact is that while demand creates a supply, just as often a supply creates a demand, and the whole business is subject to the ingenuity of mankind. Was the safety razor supplied to satisfy a demand or did the supply come first and the demand come afterward? Was it the law of supply and demand which took from the flag of Holland the commerce of the oceans and transferred it to the flag of Spain? Was it the law of supply and demand which in turn took the world commerce from the flag of Spain and put that commerce in the holds and on the decks of British ships? Or was it the farsightedness and the courage of the Dutch, the Spanish, and the British, backed by a sympathetic government which knew that the benefits of ocean trading were universally if not equally distributed among the entire population of the ocean trading nation?

It gives me a very fine feeling to realize as I speak that many of you are the grandsons and the great grandsons of the far-sighted pioneer ancestors who founded the companies of which you are now the directing forces.

Permanent Marine Policy.

Knowing your perseverance in the past, we on the other side of the Atlantic know full well that you will continue in the future to develop your ocean trade with all the ingenuity at your command. I am wondering, however, if you have the same confidence in the ability and the will of the United States to stick it out upon the seas. It should be clearly understood that the American Congress has declared for a permanent merchant marine, privately owned if possible, but a merchant marine anyhow. The American people more than ever before stand squarely behind that policy. Our declared purpose is to carry half of our exports and half of our imports. This purpose has been enacted into law for our commercial safety in times of peace and for our national preservation in time of war.

If the great nations of the world are to persevere in their ocean industry, something must be done to stop the waste upon the oceans, which I have mentioned. Changing slightly an earlier expression, let me repeat that no shipping company should be willing to go to the hospital for the sake of sending its rival to the mortuary. In the shipping world it is a common saying that it is the last thousand tons of cargo that make the profits of a voyage.

Shipowners cannot raise rates to any great extent without injury to other industries upon the prosperity of which we must rely. It follows that to improve the situation we must divide the business of the world in such a way that most of our ships most of the time will be carrying full cargo both ways, at a rate which will pay a fair return upon the investment.

Section 28.

As you doubtless know, it is three thousand miles from our Atlantic coastline to the Pacific. It is perhaps half that distance from our northern boundary to the Gulf of Mexico. Our land is covered by a network of railroads. We have a law which would permit our railroads to give a preferential freight rate to goods which were consigned for shipment to foreign ports in ships carrying the American flag. I need not dwell upon the benefits to American shipping if we attempted to invoke the law of which I speak. We have not invoked that law.

I personally wish good luck and good fortune to every craft upon the ocean, regardless of the flag it flies. From time immemorial the departure of every ship has been accompanied by prayers for the safety of its voyage. We shipping men are given to prayer not only for the safety of a voyage but for the profit of a voyage. I sincerely wish that every ship on every ocean and upon every voyage could show a balance on the right side of the ledger.

World waste is a crime. To avoid this waste is a public duty. The world is better served when a single ship carries a full cargo at a high rate of speed with a profit to the owner, than when two ships half full and at a slow speed are headed for the rocks of bankruptcy.

American Ship Florence

By F. C. Matthews.

Three skysail yard ship Florence.

THE subject of our sketch, a fine specimen of the Down East three skysail yard ship, built especially to operate in trade with California via Cape Horn, was launched in October, 1877, from the yard of Goss & Sawyer, Bath, Maine. She was 225 feet, by 41, by 26 feet; 1684 tons register, gross, owned by Charles Davenport of Bath. On one of her voyages from Baltimore to San Francisco her cargo was 2342 tons of coal. Constructed of the best material under special supervision, she received the highest classification possible for an American built wooden ship, A 1 for 14 years. She was named after the daughter of her first master, Captain John Kelley, and carried as a figure-head a life size image of the young lady. Captain Kelley was a navigator of skill and experience, who, in 1867, had taken out to San Francisco from New York via the Straits of Magellan the wooden side wheel steamship Nevada in 56 days, 18 hours actual running time, 11 days, 8 hours from Panama. For a few years the Nevada was operated between San Francisco and Panama in Webb's Line of Opposition steamers, but in 1872 the line was absorbed by its competitor, the Pacific Mail. Shortly before the change, Captain Kelley had taken command of the new ship Nimbus, built at Bath for the Cape Horn trade.

On her maiden voyage, the Florence sailed from New York, April 20, 1878; crossed the line May 17; crossed the parallel of 50 South June 13; 50 South, Pacific, June 23; the equator, July 8; arrived at San Francisco August 4, 106 days from New York. Her time of 54 days from New York to 50 South Atlantic, was very ordinary, but thenceforth she did some sailing that appears to be record, as careful research of the fastest extreme clipper passages fails to develop anything equaling. From 50 South, Pacific, to the equator she was 15 days, and 12 days later was exactly 670 miles distant from San Francisco, being then 91 days out and having good prospects of completing the passage in 95 days. Her time of 37 days from 50 South, Atlantic, and 27 days from 50 South, Pacific, to the position stated is phenomenally fast and shows that she experienced a remarkable succession of strong and favorable winds and trades. On the 91st day out, however, luck deserted her; she encountered a belt of light airs and calms, with much fog and was 15 days covering the final 670 miles of the passage. At San Francisco she loaded 2292 tons of wheat for Liverpool and made passage thence in 105 days. Arrived off Sandy Hook March 1, 1879, 30 days from Liverpool; received orders to proceed to Philadelphia, reaching there 3 days later. Her first round voyage was a success and a credit to all concerned.

A fine quartering view of the Florence making sail.

Captain R. L. Leonard now took command and had a passage of 132 days from Philadelphia to San Francisco, thence going to Liverpool in 110 days. Captain Leonard made four additional passages in the ship from Liverpool or American Atlantic ports to San Francisco, but none were fast and their average is 132 days. The returns averaged 120 days, of which the fastest was 108 days to Liverpool in 1883.

In February 1885, the Florence left New York under command of Captain Duncan, who had succeeded Captain Leonard, and between that date and June 1895 Captain Duncan completed eight round voyages via Cape Horn, San Francisco being the objective. Those outward averaged 135 days, the fastest being 112 days from Liverpool in 1888, and the slowest, 153 days from New York, 1889-1890, when she had heavy weather off Cape Horn and lost sails and spars. Of return passages, the fastest were 116 days to New York in 1895 and 113 days to Liverpool, 1893-1894. In 1888-1889 she went from Tacoma to Cork in 125 days. The average of seven runs over these routes is 123 days.

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The Relation of Maritime Injuries to Compensation

By Monroe C. Kidder, Safety Engineer, collaborating with D. A. Bary, Associate Safety Engineer.

A VERY sudden and drastic rise in the premium rates for protection and indemnity insurance and a large increase in the deductibles on these policies was applied to the San Francisco waterfront by London Underwriters on January 1, 1926, and led to the formation of a special committee representing the three associations of marine employers of San Francisco for the purpose of studying the causes of accidents in marine employment and of devising methods to minimize such accidents. This committee soon found that the services of a safety engineer would be required if any adequate survey was to be attempted. The three associations involved authorized the necessary funds and the committee secured the services of J. J. Rosedale as consultant and of D. A. Bary to make the actual survey.

From the study of the accidents which Mr. Bary and Mr. Rosedale have made covering maritime employments, it is apparent that there is real need for safety work to be done on the San Francisco waterfront. We find, for instance, that the same kind of accident has occurred more than three times in succession in the same fleet without any attempt being made to prevent its recurrence. We have seen several instances of such successive accidents of the same type. A repetition of similar accidents with different employers is constantly being drawn to our attention.

These accidents are very expensive and there is a movement on the part of a group of attorneys to institute law suits for large sums on even the most trivial injuries which have practically no negligence as a basis for the suit. For example, I have in mind one suit in the amount of $25,000 against one of the companies, the result of a sailor stepping on a hatch bar which was lying on a deck-load of miscellaneous cargo, which, it is understood, this same man had assisted in loading. The injury (sprain of his ankle) was trivial and the man stood his watch, but my point is that if there is this extreme movement to seek out even the most trivial injury as a ground on which to start a damage action, it is time that a very definite and energetic program be arranged to carry the message to the shipowners.

Under a system of workmen's compensation, this man would have required a small amount of medical attention and he would have returned to work within the seven day period and there would have been no compensation to be paid. Possibly more important, the affair would have been settled automatically under the compensation law, without delay and without legal action.

The waterfront of itself and the nature of the work along the waterfront are dangerous, and those connected with it have become accustomed to that condition and have failed to recognize it as a source of hazard and expense. This has been particularly true possibly for the reason that the risks on this type of employment have been almost wholly carried in London and the resulting cost or expense of losses has not come to the attention of the shipowners until many months after the occurrence of the accident. It is possibly because of the fact that the underwriters were so far distant and their agents here so few and that it was a question of proof of negligence each time that the question was allowed to drift or take its own course until the Final Settlement. At any rate very little attention was paid to the safety phase of marine employment until the compulsory compensation bills in Washington appeared before Congress and the sudden rise in the rates in the maritime protection and indemnity insurance occurred.

The rule has been that where a sailor is injured in the service of the ship he is entitled to care and cure at the expense of the ship, irrespective of any question of negligence on the part of any member of the ship's company and irrespective of whether the seaman was guilty of contributory negligence, but ordinarily he cannot recover damages unless fault can be brought home to the owner.

In Admiralty practice the general maritime law always had been that an owner was not personally liable for the obligations of his ship as distinguished from his own agreements or delinquencies. It regarded the ship as a distinct individuality similar to a corporation. The common law, on the contrary, considers the ship like any other kind of personal property and holds the owner correspondingly liable because his agents were in charge, and he is liable for whatsoever they do within the scope of their agency. The maritime law retains an earlier notion of the common law, that it is against all reason to put blame or fault upon a man for the negligence of others and declines to hold him personally for what he cannot personally control. It also recognizes the fact that men of means will not invest in ships unless they can be protected against the unlimited liability of the common law. It holds that such liability is inherently unjust when applied to the shipowner and it also accepts the situation in which the capitalist declines to invest in shipping unless that injustice is averted. Hence came the rule passed by Congress in June 26, 1884, that "the owner is not liable on account of the ship beyond the value of his interest therein and her freight pending"; and the corollary that he might absolve himself from all liability by abandoning the ship to her creditors.

In modification of this common law rule, the United States Supreme Court said in 1918 in Chelentis vs. Luckenbach, 247 U.S. 377, in knocking out the common law rights for injuries occurring on boats that when suit is brought in the State Courts it must be brought under the admiralty law.

Until March 30, 1920, the general maritime law did not give any right to recover for loss of life. On that date, Congress approved an act which provided that wherever the death of a person shall be caused by a wrongful act, neglect, or default occurring on the high seas beyond a maritime league from the shores of any state of the United States, etc., the personal representative of the deceased may maintain a suit for damages in admiralty for the benefit of the deceased's wife, husband, parent, child, or dependent relative against the vessel, person, or corporation which would have been liable if death had not ensued. It will be observed that this act places loss of life on the high seas in the same category as personal injuries. The act does not affect the right of owners of a ship to limit their liability to the value of the ship.

Congress, on June 5, 1920, in the Merchant Marine Act, provided that any seaman who shall suffer personal injury in the course of his employment may, at his election, maintain an action for damages at law, with the right of trial by jury, and in such action all statutes of the United States modifying or extending the common law rights or remedy on cases of personal injury to railway employes shall apply. Admiralty did not provide for trial by jury.

The rights under the Federal Compensation Act of Railway Employees (and this does not mean workmen's compensation) thus conferred upon seamen are those given by Acts of Congress approved April 22, 1908, and April 5, 1910. These acts gave to employees of railways engaged in interstate and foreign commerce a right of action against the employing carrier in case of injury or death of the employee, notwithstanding that the accident may have been caused by acts of a fellow servant or may have been due to one of the risks naturally incident to the employment, and notwithstanding that the plaintiff may have been guilty of contributory negligence, although in the latter case the damages are to be diminished in proportion to the amount of the employee's negligence. Suit may be brought in the state or federal courts, which are given concurrent jurisdiction in such cases.

It should be observed that under neither the Merchant Marine Act nor the Railway Employer's Acts is the jurisdiction to be exercised by the court sitting in admiralty. The jurisdiction invoked is that of the courts of common law.

Where, however, there is negligence on the part of the shipowner in the providing of seaworthy ships, or on the part of the officer in caring for the injured man, the admiralty will award damages; if there be contributory negligence it will not prevent recovering, but the damages will be apportioned or divided. This was the rule laid down (in Max Morris case, 137 U.S. 1) which is still the rule.

The principle on which vessels are held liable for injuries to seamen due to unseaworthiness is simply an application of the rule of law that every master is bound to provide his servant with a safe place to work; that is to say, a place as safe as any prudent man would provide for the performance of work of similar character, and that failure to provide such a safe place is actionable negligence. Where an employee on a vessel placed an empty keg on a pile of hatchway covers so that an accidental jar caused it to fall into the hatch and injure a stevedore, the master and owners were liable, and the ship was held for violation of the duty to provide a safe place to work. See Jas. B. Thomas case 86 Fed. 658.

Frequently sailors have to go onto the dock to do stevedoring work, and if injured, are removed from the jurisdiction of the maritime law and the Jones Act applying to railway workers, and receive benefits of the state or locus in which they are injured. See Todall vs. Sudden & Christenson (5 Fed. 2d 462, C.C.A. 8th Circuit). See also I. A. C. vs. Nondenboldt, 259 U.S. 272 (decided in 1922) in which the United States Supreme Court held that there is no general maritime rule prescribing liability where the accident occurs on shore even though the employer be under a maritime contract and thus knocked out the tort rights in admiralty for a stevedore sailor injured on the shore. Likewise, when a stevedore in a compulsory state, such as California, Washington, New York, Illinois, or Ohio, goes from a dock onto a boat, he places himself under the maritime jurisdiction and loses the jurisdiction of the state. There is an exception to this rule in the few states having an elective compensation law. Here, because of the elective features, the courts have seen fit to recognize the jurisdiction of the state as extending onto the boat to protect the stevedore. See West v. Kozer, 104 Ore. 94.

This brings us to the consideration of the present compulsory status of maritime workmen's compensation acts. The ship owners on the Pacific Coast appointed a committee last fall to draft a federal compulsory workmen's compensation bill. This bill is along the general lines of compensation statutes, quite like those of California and New York and provides for weekly compensation for injuries or death to maritime workers without regard to negligence.

The Graham Bill, known as H. R. 12063, introduced and sponsored by Representative Graham, chairman of the Judiciary Committee of the House of Representatives, and by John B. Andrews, chairman of the American Association for Labor Legislation, was the most drastic bill before Congress. Disabilities under this bill could run to ten thousand dollars and death benefits to as high as sixteen thousand dollars, for a single injury or death to a workman. The weekly compensation payments provided for twenty-five dollars a week, the highest yet written into any compensation bill.

The Cummins Bill, known as S. 3170, was passed by the Senate in July of this year and is now in the House, a live bill, ready to be passed and to become a law at the opening of Congress in December. This bill will remain alive until March 4, 1927.

The representatives of the shipowners from both the Atlantic and Pacific coasts were present at Washington during the discussion and meetings of different committees, considering this subject, and committed themselves of record that they were in favor of a compensation law for maritime workers.

The Cummins Bill and the Graham Bill covered maritime employments, but excluded seamen. Seamen were excluded at the instance of Andrew Furuseth. The shipowners bill, which was formulated on the Pacific Coast by a committee of which the writer was privileged to be a member, included seamen. This bill is now under process of review and revision by interested bodies at all the principal ports of the United States and will in its perfected form be presented at the next session of Congress.

Every compensation law provides for safety standards and safety work and safety rules, and for the machinery to enforce these rules and regulations. This is just as much a protection for the employer as for the employee, because under compensation the employer pays for the accident, no matter who is at fault, and these rules and regulations are set up for the express purpose of preventing accidents.

The work of the shipowners' committee together with the safety engineers working under its supervision is of the utmost value and importance to the shipowners at this time, because it has been found, after the examination of several thousand accident reports, that very few give the cause of accidents. Data are thus being gathered showing the unsafe conditions and places of employment on the waterfront; bulletins are being issued to point out these things to the employers; and proper report forms and instructions are being prepared and issued, so that accidents will be attributed to their real causes. This is one of the first

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Puget Sound Maritime Safety Program

By M. E. Arkills, Safety Engineer,
Waterfront Employers' Association, Seattle.

We hope that you will care to hear what we are doing on Puget Sound to make marine work safer. Be that as it may, if I were not to use our own experience I would indeed come empty-handed on marine safety. It is not because we are the only ones to make a genuine effort at marine accident reduction, but because we know more about what we are trying to do than we know about what others —many miles away—are doing.

S. F. C. Sweeney, safety engineer on the Vancouver waterfront, is doing a splendid piece of work and under conditions in British Columbia equally as difficult as those in Washington.

George Marr of Cleveland is putting over the best organization for the Great Lakes Carriers' Association that could possibly be devised for the work his company has in hand. It is indeed refreshing to know that the seamen can be interested to the extent that he has interested them.

In New York our good friend, W. E. Welch, with the Travelers Insurance Company, is making himself very much felt in marine safety.

Now you are making a start here in San Francisco that has all the earmarks of a real set-up. There is no doubt that from their fund of experience, Messrs. Rosedale and Barry will help you to make a better showing than has yet been made in this new field of marine safety.

A little over two years ago, when we started to take stock, we found our Safety Ship had sprung a leak far out at sea and that a real storm was on. We found that out of each 157 days worked, 32 days were lost by injury. Putting that in another way, a longshoreman would work 4 days and 3 hours then be off one day with injury. Again, if 44 men were working, 10 must stand by to take the place of those who would become injured. It seemed that the future held little more than "death and destruction" for both men and management.

The Causation Radio Compass.

Right at this juncture, we tuned in our "Causation Radio Compass" and found that when we knew the causes of accidents, our course became reasonably clear. The injuries that cost the most money for settlements were caused by swinging loads. When working the ends of the holds, and the wings, it is very difficult to keep down the swinging of loads. We get the turn-around on Puget Sound, being the last port of call, with all the accumulation of dunnage and refuse. We often work cargo beamed up to such a height that it is necessary to work from swinging scaffolds. Sometimes this cargo starts to shift at sea, and while being worked will give away, with the usual attendant hazards. These little jags of general cargo, widely distributed all over the ship, are slow, expensive, and dangerous to handle.

From our first studies we determined our points of attack; from the second charting, six months after starting, a distinct improvement was recorded for some of the worst offending causes; the third survey showed marked improvement in nearly all lines. This indicated better supervision and general interest.

Some engineering studies have been conducted. The multiplication of load on falls at variant angles was shown by the simple chart. This was one of the most gratifying things that we accomplished in our early work, as it aroused great interest among the men. The result is that hatch-tenders and winch drivers realize better than ever before not to pull the falls up to a point where they pull against each other.

Another important set-up is the angle we get on a guy line. We are only doing our best when we get the guy as near in a straight line with its pull as conditions permit with as much drift as possible.

Engineering Research.

Through the generous help of the University of Washington, one of its graduate mechanical engineers, Fred H. Rhodes, conducted tests on small booms. Here an attempt was made to reproduce working conditions. Dynamometers or spring scales were put in each line, showing stresses developed in falls, topping lifts, and guys. We set out to prove that the belly of the boom should be moved toward the heel instead of being in the measured center of the stick. While this was not conclusively proved, the tests pointed in that general direction. We also found that the standard top end fittings of booms were responsible for unfair conditions tending toward failure. A pin connection at the upper end would eliminate this difficulty. There are Norwegian ships, built twelve years ago and making Puget Sound Ports, that are equipped with proper pin connections. For those who would like to look into the details of the boom tests conducted by Mr. Rhodes, you will find a complete account in the July issue of the Railway & Marine News of Seattle.

While we have other items under investigation, we have one more of importance that is completed; namely, "Wire Rope, Its Use and Inspection." A reasonable and fairly accurate determination of the relative condition of wire rope can be made by the observation of a few simple rules laid down on a small card which is available. A paper devoted to this subject was read before the last meeting of the Associated Safety Engineers of Washington and appears in this issue of Pacific Marine Review.

Safety Dinners.

Dinner safety meetings are given to foremen and hatch tenders. (The hatch tender with us acts in the capacity of a straw-boss). The managers also attend. Aside from filling out their belts, there is a touch of sociability and good will around the table that makes for pleasant thoughts toward our safety work instead of all work and no play. For example, here is a program of a typical safety dinner held March 3, 1926, at which there were twenty-four employers and seventy-five foremen and deck men present:

1. Vocal Solo....................A. LaLonde
2. What May the Management Expect of the Foreman in the Way of Safety?....................Carl Strout
   Discussion led by....................A. J. Wagner
3. "Inside Information"....................F. P. Foisie
4. Vocal Solo....................C. Richardson

5. Fire Prevention..........................Captain S. E. Sanislo
6. What Can the Hatch Tender Do to Prevent Injuries?..........................George Nelson
7. Deckmen As Seen From the Scow..................J. J. Coles
8. Vocal Solo..........................C. Richardson
9. Summary..........................M. E. Arkills

Our plan of joint representation is no small factor in the success of our safety work. Right in line with this plan we have a Joint Safety Committee whose function is to deal with such problems as come up affecting safety of the workmen. After a rule or suggested practice has been laid down, the management takes over its enforcement. Our committee is composed of four employes, four employers, and one foreman. The docket of our last meeting, August 18, was (1) Lighting on Pier 41 beyond the end of the shed; (2) Makeshift levers for driving single winches double; (3) Working in the bight of the line (carried over for completion at this meeting).

Few rules are made, none of which should restrict operations; mostly suggested practices are laid down, usually resulting in less lost motion.

We work in close conjunction with our State Department of Labor as far as our onshore work is concerned. We have an arrangement with them, whereby we centralize the activities in such a way as to be given full credit for the work we do even though the State Safety Code does not exactly fit stevedoring operations. Our present administration is doing good safety work throughout the State and is quick to apresults is less exhibition of temper and greater haron the waterfront; nevertheless one of the noticeable preciate what we are trying to do.

Just one word further on personal injury cause classification—the real test of usefulness of such classification is, **Does it suggest the remedy?**

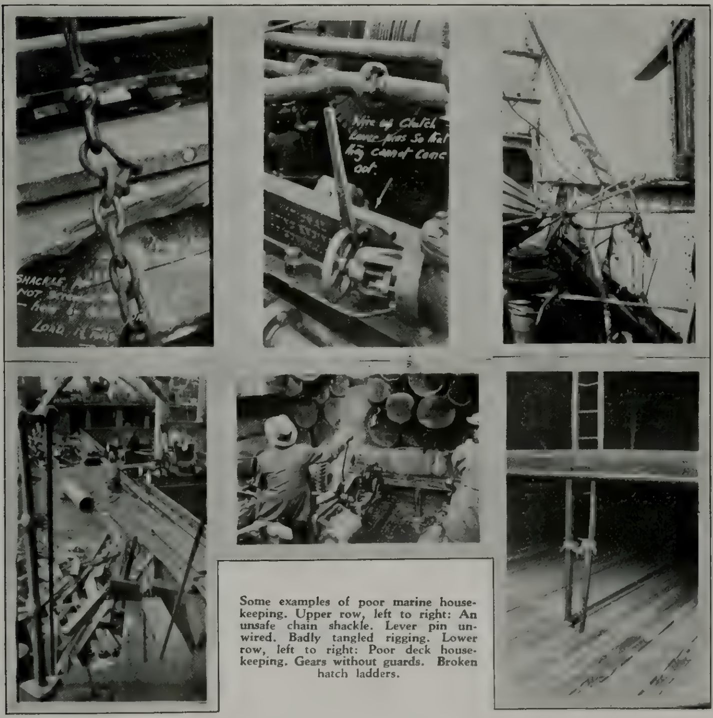
Results.

We are making no attempt to run a Sunday school mony generally. Some other results that may be noticed are:

1. Where men were working 4 days and 3 hours, and were laid up one day with injury, they are now working 10 days and 4 hours for each day lost by injury.
2. There is less suffering.
3. Greater earning power.
4. Less men needed to carry on the work.
5. Lower labor turn-over.
6. Less exposure of green men.
7. More happiness.

In spite of the abominable "Sue or Settle" system with its (honorable?) ambulance vultures, this accident reduction program probably has saved the insurance carriers on Puget Sound well over $60,000 during the year 1925. The insurance carriers are now participating in our safety work and we are assisting in the settlement. One company with the worst record before safety work was begun, has made a reduction on their own experience of 96 per cent.

Many times when we learn of the results of a personal injury case before a judge and jury, we are reminded of the story of the old judge who was retiring from the bench. His townspeople were doing him honor with a banquet and appropriate speeches. One speaker arose to say, "Judge, I congratulate you upon the way in which you have dispensed with justice for 30 years."



Some examples of poor marine housekeeping. Upper row, left to right: An unsafe chain shackle. Lever pin unwired. Badly tangled rigging. Lower row, left to right: Poor deck housekeeping. Gears without guards. Broken hatch ladders.

We thought we wanted Federal Compensation for offshore workers until we saw what was being offered to us by Congress, which would be more properly named, "confiscation." We still believe that if a compensation law could be scientifically and equitably promulgated, the result would be generally good to society.

We sincerely believe that our joint organization has proved the value of frankness between men and management. In our safety work, many of the best suggestions come from the men and are discussed freely and without prejudice. This is invaluable in spreading the knowledge of safety to the men, and unless you can get your men working with you, results will not be satisfactory.

In engineering we have what is known as a Triangle of Forces. So in safety we have The Men, The Management, and the Owner—the men to be interested in their own safety and that of their fellow-workmen; the management to supervise, with safety as no small part of the production program; the owner to furnish a safe place and safe equipment. With all these working together harmoniously we will attain the results we desire.

American Diesel Shop Practice

By Charles F. Gross, A.M.I.N.A., Asst. Professor of Marine Engineering, University of California

OUR humorous publication, "Life," gave recently a definition of an expert. It said, "An expert is an ordinary guy in his own home town." Recognizing from home contact that I qualified under this definition and desiring to become a little more familiar with the manufacturing of diesel engines in this country, this past summer I decided to visit the plants and actually see what was being done. So for three months I travelled from Boston to Berkeley, visiting thirty-two different plants, in twenty-four of which the output was exclusively diesel engines, some large and some small The results of my observations—the outstanding features which impressed me—may be helpful to others. For various reasons I cannot give the manufacturers' names, although no doubt my reference to their particular engines may be apparent at once to some companies.

It was interesting to see the variety in shop plants. These ranged from the moldy old machine shop to the well planned factory. The men who greeted me and showed me around the plants were interesting. Quite naturally they talked of their accomplishments gladly and of their failures more reluctantly; but to get frank statements was more than I had anticipated prior to starting on the circuit. Some of those who conducted me about knew their engines well; others, judging by the way they answered my queries, did not know the simple fundamentals of their products. At one place I was informed by my guide that their particular diesel engine had no carburetor. Ever since I have been wondering if this startling statement was a reflection on my intelligence or on that of my guide.

I stayed at each plant a length of time varying from two hours to three days. The company at whose plant I stayed only two hours had much of interest that might have induced a longer stay, but I could tell from my reception that I was not a welcome guest. Not only at one, but at several places I was impressed with the air of secrecy which prevailed when I asked my guide certain questions. I hardly knew whether the war was still on or whether I was regarded as a spy in their establishment. Being out, as I was, simply to gather information that would assist me to instruct the engineering classes at the University of California, I thought that these companies were losing an opportunity for good publicity. This impressed me as being the wrong attitude to take, because at this time their policy should be one of educating those who may be future judges of their engines and of placing before the public the whole economy of internal combustion engineering.

The actual practice of shops in producing details varies greatly. For instance, I found three different methods of making bearings, each manufacturer thinking and giving conclusive proof to me that his way was the cure-all for all bearing fractures. One method was the spinning of the bearing shell with its dovetailed grooves at 3000 to 5000 revolutions per minute in a convenient holder and then pouring into the bearing the molten babbitt, so that the metal was thrown centrifugally out to the circumference, the slag collecting in the center core, which is not used. This insures a good homogenous mixture, but at the same time does not counteract the defect inherent to dovetail grooves.

Another method of casting bearings is to pour both top and bottom shells in a stationary mold and, while the metal is still in its molten state, to keep puddling the mixture to allow gases and slag to rise to the surface. This likewise does not get around the dovetail groove defect. Few realize that cast steel has a coefficient of expansion about 50 per cent greater than that of babbitt metal, and that therefore they should not be interlocked by the dovetail grooves common to most bearings. When such a bearing warms up the shell, being the more rigid of the two, throws the strain upon the babbitt, which almost inevitably cracks. I found two companies which had recognized this fact and were casting their babbitt bearings independent of the cast steel shells, although both babbitt and shell were such that they could be rolled around the shaft.

A striking feature on one engine should be cited. It is customary in diesel engines to fit a relief valve on each cylinder. On this engine, however, I noticed there was no such valve on any cylinder, and I asked what happened if by any chance excess pressure should build up in the clearance space. "Oh, the cylinder head lifts and the pressure is relieved between the head and the cylinder block, after which the head reseats itself," was the reply. Actually this is accomplished by turning down the central portion of the holding-down bolts for the cylinder head to a less diameter than at the root of the thread. Relief from excess pressure depends on the bolts stretching and allowing the cylinder head to raise.

One of my pet hobbies was to find out what had been done in the matter of investigating torsional vibrations in any particular engine. This has been a tender subject with several companies due to crank shaft failures, and I found that many had gone rather fully into these computations. When I was shown and went over their computations with them and saw "miles" of torsionalgrams of investigations in this special field, I was convinced that they actually knew what was the critical speed of each particular engine and at that speed the engine was not to run. All marine engineers should realize that the critical speed of an engine in the shop may be very different from the critical speed of that engine when it is placed in the ship. The arrangement of the weights along the shaft are different due to the long line of the propeller shafting and the heavy propeller at the extreme end. Such different combinations of weights in the shop and ship have necessitated, in one case, the installing of a lighter fly wheel and the changing of the firing order of the cylinders in order to obviate the several critical speeds. I consider the subject of critical speeds of more importance than that of relative fuel economy, as upon it may depend the fracturing of a shaft or the satisfactory over-all working of the engine.

I should not pass over casting problems. This is a field in itself. Some firms were having worries, and I should say those who have not had many rejections or poor castings will possibly meet their problems from castings after installations. To me, some cylinder head castings resembled Swiss cheese; the intricate passages and nonsymmetrical openings were such that I cannot help but prophesy that engines equipped with cylinder heads of such design cannot last long in service.

It was fascinating at one foundry to watch them clean the sand cores from castings. The castings were taken from the moulds and laid in a totally enclosed, water-tight room. Through one side protruded two large moveable nozzles which could play a jet of water at 300 pounds pressure upon the castings. In about one-quarter of the time that a man would take to clean the castings this room full of castings was as clean as a whistle and nothing remained for the shipper to do but to cut off the risers, fins, and nails which held cores in place. Cleaning costs were decreased considerably by this novel method.

In the small power engines an interesting development is going on at present. One manufacturer, I found, has experimented with 240 different nozzle tips for airless injection and still is not satisfied with the results. New trunked slipper-type aluminum pistons were being used. Some manufacturers spoke very highly of them as meeting with success in engines already installed, whereas two companies had given up their use. From tests of aluminum and cast iron pistons in the same engine interesting data are at hand. It appears that the maximum temperature of several points on the piston crown is about 200 deg. F. higher in the cast iron piston than in the aluminum piston. This is because the heat conductivity is four times as great in the aluminum piston as in the cast iron piston. Also six per cent more power is obtained in the aluminum piston engine and this increase in power was with eight per cent less fuel oil per brake horsepower per hour.

There is a tendency in all the small engines to resort to higher revolutions per minute, which means weight reduction. I question whether this is a move in the right direction, although only time will tell if such engines will stand up under the strain.

I was impressed with the workmanship on one of the engines which used port scavenging. The openings in the cylinder liner had been cast fairly close to the required port area, but there still remained considerable excess metal which had to be removed. It was a long, tedious and expensive job to hand file cast iron of 205 Brinell hardness in order to have these scavenging bridges and sides of the port fit special templets so that there would not be any eddying of the scavenging air as it entered the cylinder. This extra work, however, cannot help but reflect on the operation of the engine.

(To be Continued.)

Welded Joints for Fire Protection Systems

BECAUSE of the highly flammable nature of their precious contents, every possible precaution is taken around oil storage tanks to prevent fires. Smoking or carrying open flame lights are positively forbidden. Elaborate piping systems for Foamite or other fire-fighting compounds are installed; cross connection pipes are installed to draw off oil from the bottom of a burning tank, and an earthen levee is thrown up about each tank to prevent communication of fire from one tank to another if one should collapse or boil over. Even static electricity is guarded against by carefully grounding all metal vessels and lines. Notwithstanding these and many other precautions, tanks occasionally burn, often resulting in great property damage. Recently in southern California, lightning struck a 55,000-barrel oil storage tank. The resulting fire was communicated to thirteen other 55,000-barrel tanks, and in addition six 1,000,000-barrel underground reservoirs for crude oil were destroyed with their contents. The entire area was utterly wrecked and a total loss.

A close study of the wreckage was made by engineers representing oil companies, tank builders, pipe and pipe fitting companies, and others. A number of very significant facts were brought to light.

For instance, it was found that the Foamite system piping had failed under the intense heat. Thus it was impossible to smother several small fires in their early stages, fires which later grew into gigantic proportions. The concensus of opinion was that had this piping system remained intact, several of the tanks would certainly have been saved.

Failure of the Foamite piping was characteristic of all screw-coupled piping in the fire-swept area, even that buried under ground. Screwed joints pulled out of the fittings and couplings, other couplings and fittings warped or split, allowing the joints to separate. Many fittings collapsed entirely.

In joints made by oxwelding, however, there was no failure whatever. In the pipe connections to a booster pump all the fitting connections failed, yet all the welds in steel pipe remained intact.

The threaded flange connection at the valve of a 10-inch oil line pulled loose but the butt weld a foot away and the oxwelded tee four feet away withstood the fire perfectly.

This fire has served to emphasize again the superiority of the oxwelded joint. It has already been proved times without number that a weld is stronger and more efficient than any other type of joint—that it is leakproof, does not deteriorate with age, and does not corrode as rapidly as the pipe itself.

The experience gained by this petroleum company at such great expense is a lesson that should be heeded by not only the superintendents of other petroleum companies but by factory executives and managers everywhere. Don't take chances with piping installed for fire fighting. Put it in with welded joints. They are dependable in all emergencies.

Marine Casualties and Compensation

(Continued from Page 503)

steps in the elimination of accidents. The safety committee of the shipowners, in planning a program of accident prevention, is anticipating the necessity which it will encounter when a compulsory compensation law for maritime workers is enacted and seeking a solution of the problem which this law will present.

All shipowners and maritime employers will do well to study carefully the reports and data gathered by their safety committee. In doing so they will undoubtedly be brought to the conclusion that cooperative safety work adequately carried on along the San Francisco waterfront will be not only a much better investment than protection and indemnity insurance but will ultimately pay dividends in the reduction of direct material handling costs. It is always better to sanely regulate your own business than to have an outside group thrust upon you insanely drastic regulation.

Solid Injection Combustion Methods For Diesel Engines

By C. E. Klitgaard.

PUBLICATIONS covering the use of so called solid injection fuel in diesel motors deal principally with two methods, the pre-combustion chamber method and the jet atomizing method. For many years experiments have been carried out with a view to developing both of these, as well as many other methods of solid injection, it being thought that the pre-combustion chamber method would be the most suitable for small motors, and the jet atomizing method for the larger motors.

Out of all the number of solid injection methods tested, the jet atomizing method survives as the most popular of the lot; the pre-combustion method running a poor second; most other methods have been discarded. It would be interesting to compare the factors which these two surviving methods have in common, as well as their differences, and in some future issue we will endeavor to do so, but will confine the present article solely to an explanation of the jet atomizing method, based principally on the very extensive research work carried out by Fried. Krupp A. G. at Essen, covering this subject.

The whole question of the jet atomizing method of solid injection was discussed in August 1925, at Augsburg, during the annual convention of the Society of German Engineers, in a paper read by Chief Engineer H. Hintz of Essen. The main subject of this paper dealt with the advantages and disadvantages of the jet atomizing system of solid injection, also setting forth the influence of multiple jets, their intensity, speed, and direction as they strike against the specially formed piston head, as well as the influence upon combustion of artificially rotating the air in the combustion chamber. The subject matter of this paper is republished here through the courtesy of Chief Engineer E. Herkt of Fried. Krupp A. G., Kiel.

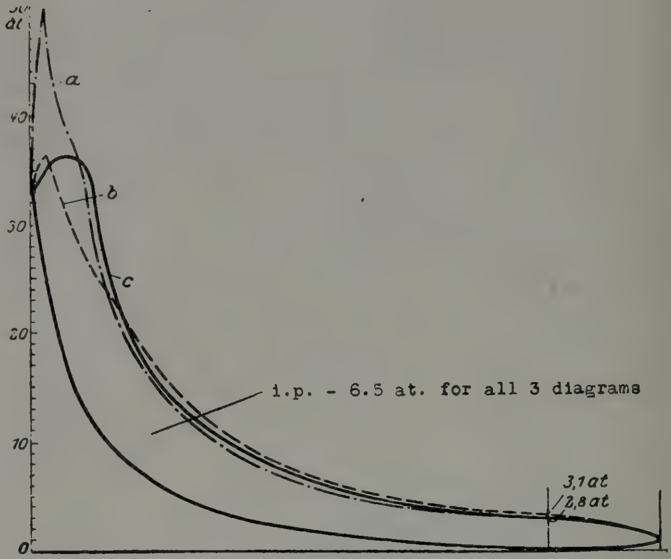
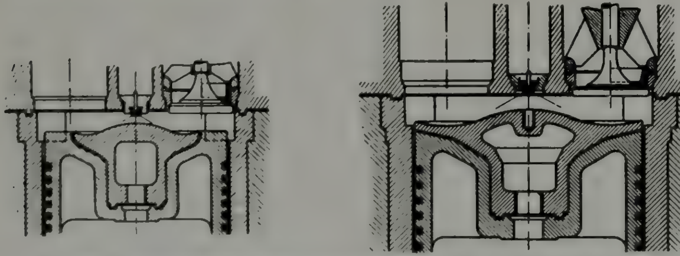


Fig. 1. Comparison of combustion results in hemispherical and in flat combustion chambers.....(a) pressure curver for hemispherical combustion chamber; (b) same as (a) but without increase in pressure during combustion; (c) pressure curve for flat combustion chamber.

"Most engineers prefer an hemispherically shaped combustion chamber; but a new type of flat combustion chamber has been developed, from which very good results have been secured; in fact, it has become possible to secure combustion under constant pressure with this type of combustion chamber, a result which has not been possible with a hemispherically shaped chamber.



Figs. 2 and 3, showing combustion chambers of the two test motors. The smaller combustion chamber is for a 1-cylinder motor, 335 m.m. diameter, and 500 m.m. stroke. The larger combustion chamber is for a 4-cylinder motor, 420 m.m. diameter by 650 m.m. stroke.

Previous to the completion of the experiments, upon which the conclusions outlined in this paper are based, it was the general belief among engineers—a belief still entertained by many modern engineers, that in order to insure successful jet atomizing a more or less typical explosion is required, instead of the constant pressure combustion otherwise generally desired, and for this purpose an almost hemispherical combustion chamber has to be used. The experiments carried out at Essen, however, show that these restrictions are not necessary in order to obtain efficient combustion with jet atomizing, but that excellent results can be obtained by constant pressure combustion and flat combustion chambers. The shape of the combustion chamber is of course not the only factor entering into good combustion, good combustion depending upon combining the shape of the chamber with the number, intensity, velocity, and direction of the fuel oil jets, as well as with the air movements in the combustion chamber.

It is a well known fact that the most favorable conditions when using a hemispherical combustion chamber are obtained by adjusting the force of the fuel oil jets so that the oil particles will be entirely burnt before reaching the piston head. Though this insures very efficient combustion, the increase in pressure upon the mechanism when on top dead center is almost equal to the explosion pressure, and therefore an excessive strain is placed upon the machinery. This unfavorable increase in pressure, resulting by the use of this method of atomization can, however, only be prevented at the expense of efficient combustion.

Fig. 1 shows three diagrams, each with a m. i. p. of 6.5 ats. (about 92 pounds per square inch) or in other words, the m. i. p. at full load. The efficient combustion which we have just described, is outlined on diagram (a) by the sharply falling expansion line and the low final expansion pressure of 2.8 ats. (about 40 pounds to the square inch.) This diagram was taken from a motor with hemispherical combustion chamber, and you will note that the ignition pressure of 50 ats. (about 710 pounds per square inch) is considerably in excess of the 33 ats. compression pressure (about 470 pounds to the square inch); in other words, a very undesirable stress is placed upon the mechanism.

In diagram (b), also taken from a motor with hemispherical combustion chamber, the high undesirable ignition pressure has been reduced, but the expansion line shows very definitely a considerable postburning of the fuel, and this is also confirmed by the higher final pressure of about 3.1 ats. (about 44 pounds to the square inch).

Diagram (c), on the other hand, is taken under the most favorable conditions from a motor having flat combustion chamber, and the sharply falling expansion line and the low final expansion pressure of about 2.8 ats. (about 40 pounds to the square inch) shows a steady increase of the ignition pressure and quick combustion of the injected fuel.

The final pressure in all three cases is measured at about 18 degrees before low dead center, at the moment when the scavenging valve is beginning to open.

Test Motors.

Two motors were at disposal for the experiments; one, a 1-cylinder engine of 335 m. m. cylinder diameter; and one 4-cylinder engine with 420 m. m. cylinder diameters, both motors being operated at 220 revolutions per minute.

Figs. 2 and 3 show clearly the combustion chamber shapes of the two motors; there is nothing remarkable about the cylinder or the covers, but as you will note, the piston heads are convex in the center in order to increase the angle between the oil jets and the piston heads gradually during the period of injection, in such a manner that at the beginning of injection the jets are striking the piston heads surfaces at a tangent. The pistons are provided with insert, or so called "mushroom" pieces, which in the case of the small motor only partly covers the piston head, while in the larger motor entirely covers it.

While in usual practice it is deemed most desirable that the fuel jet does not strike the piston heads, such a result is, in this particular instance, desirable, in that thereby the rather solid core of the fuel jet is completely atomized by striking the hot mushroom and immediately fills the entire combustion chamber. By this arrangement no soot is deposited; soot being only found in the exhaust gases when using nozzles with two horizontal oil jets, whereby the oil instead of striking the mushroom is sprayed against the cylinder walls.

The nozzles are provided with four perforations each, the nozzles for the small motor having holes 0.4 m. m. in diameter and for the larger motor 0.55 m. m. in diameter. It is worthy of note that more perforations though having the same total cross section as the four hole nozzles instead of giving better results showed poorer combustion for both size of cylinders. The fact that smaller holes in the nozzles does not improve the combustion, permits the readier use of a high grade material for nozzles, as it has been found that great difficulties are experienced in drilling holes of less than 0.4 m. m. to 0.5 m. m. in diameter in the very hard steel essential for satisfactory fuel nozzles.

Upon opening up the cylinders at the conclusion of the experiments, the mushroom clearly showed where the fuel jet had impinged upon the surface of the metal and small deposits of zinc oxide were found around these spots, which were due to the fuel having been stored in tin or galvanized barrels. When using nozzles having the correct angle of jet, the exhaust gases are slightly visible under properly balanced conditions.

Fig. 5 outlines the pressure condition in the working cylinder. Thermic conditions of the motors are shown by the late ignition lines and relation of combustion and compression lines. It is to be noted that the late ignition is at a minimum with the engine under full load and amounts, at 200 revolutions per minute, to 0.00333 seconds, corresponding to a crank angle of 4 degrees. The compression line passes smoothly and without any considerable increase of pressure into the combustion line in spite of the quick lifting of the fuel needle.

Starting the cold engine increases the late ignition because

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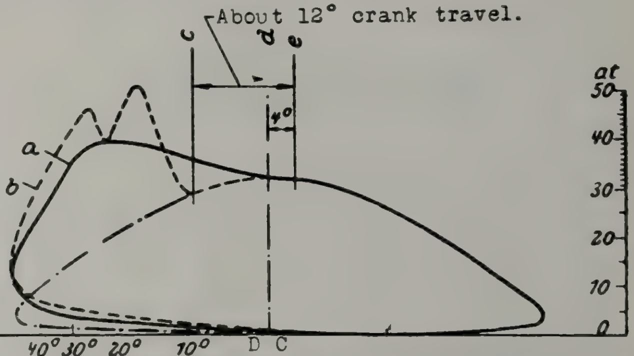
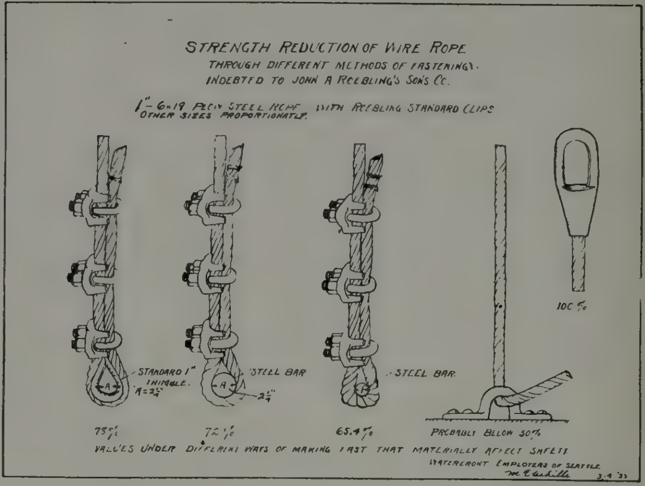


Fig. 5. Pressure curves of firing trials and working cylinder having flat combustion chamber. (a) curve of efforts under full load; (b) starting the cold motor; (c) start of injection period; (d) firing commences for card (a); (e) firing commences for card (b).

Wire Rope, Its Use and Inspection

By M. E. Arkills.


STRENGTH REDUCTION OF WIRE ROPE
THROUGH DIFFERENT METHODS OF FASTENING.
INDEBTED TO JOHN A ROEBLING'S SON'S CO.
1" - 6x19 PLOW STEEL ROPE WITH ROEBLING STANDARD CLIPS
OTHER SIZES PROPORTIONATELY.
STANDARD 1" THIMBLE.
A = 2¼"
STEEL BAR
2¼"
A
STEEL BAR
100%
78%
72%
65.4%
PROBABLY BELOW 50%
VALUES UNDER DIFFERENT WAYS OF MAKING FAST THAT MATERIALLY AFFECT SAFETY
WATERFRONT EMPLOYERS OF SEATTLE
M. E. Arkills 3-4 '25

THE following information is extracted from a paper read by M. E. Arkills before the Association of Safety Engineers of Washington at Spokane, July 24, 1926.

It has been stated that wire rope was the first big step toward safety in materials handling. It is from the safety aspect that we wish to consider wire rope. Every industry is, to a great extent, interested in the proper use of cable. The lumber industry, like marine shipping, would be hit hard if it could not continue the use of cable. It is common to see 25 lines leading to one spar-tree in high-line logging. It is common to see some of the simple laws of mechanics repeatedly violated in these operations—all too often with disastrous results. We here have reference to loads suspended on taut lines. By comparison consider the sag found necessary in the main cables of the Brooklyn Bridge.

Now let us look at enemies of wire cable:

Small sheaves, introducing excessive bending.

Improper grooving in sheaves will either act as a severe abrasive, soon wearing the cable out, or it will fail to properly support the cable in proper form by allowing the core to become crushed. A common sight on board a foreign ship is cable that has failed to retain its shape, but which has flattened out like a ribbon. A proper groove can be made by using a radius increased by 1/30 of the diameter of the cable to be used, the sides of the groove to form an angle of 17½ degrees with the plane of the sheave. The material in groove should be machined to a smooth finish.

Repeated short bending will set up wear that will cut or nick the wire to a point that will help to hasten failure.

Fouling and kinking will shorten the life of the cable. It is common practice to be careless in this regard.

Corrosion is no small enemy—the rope should be carefully opened and examined for rust. Oil or other sealing substance should be used to prevent rust.

A set-up that will introduce reverse bending is bad, while a record of a million bends under recommended conditions is not uncommon.

Pulling around small or sharp corners is severe and destructive treatment.

Means of making fast, which may impair the cable from full strength down to 30 per cent, besides permanently injures the wire.

Note the illustration entitled "Impairment of wire rope by different means of making fast."

Every-day service subjects wire rope to tension, compression, bending, torsion, friction, abrasion, and fatiguing. Fatiguing is caused by stressing repeatedly beyond the elastic limit of the metal.

The minimum sheave recommended by the manufacturers of cable will reduce the working strength 9 1/3 per cent, which added to the safe working load serves to reduce the factor of safety. And each reduction in the diameter of the sheave will reduce the permissible working load inversely as the diameters.

We have been considering uses and abuses of wire. Now let us see if visual inspection such as you and I may carry on without the aid of instruments, can avail us anything for economy and safety:

1. It has been found that wires nearly always break on the outside or crown of the strand; then it is

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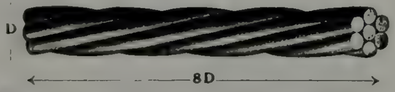
CABLE INSPECTION



Strand		Wires per Strand		Total Wire	Broken to Condemn	D		8D	D		8D
6	×	7	=	42	4	⅜"	=	3"	⅞"	=	7"
6	×	12	=	72	7	7/16"	=	3½"	1"	=	8"
6	×	19	=	114	11	½"	=	4"	1¼"	=	10"
6	×	24	=	144	14	9/16"	=	4½"	1½"	=	12"
6	×	37	=	222	22	⅝"	=	5"	1¾"	=	14"
8	×	19	=	152	15	¾"	=	6"	2"	=	16"
8	×	24	=	192	19						
7	×	7	=	49	5						

If in a distance equal to eight diameters 10% or more of the total number of wires are broken it should be taken out of use.

Compliments of

WATERFRONT EMPLOYERS OF SEATTLE

Expert Propeller Design

WHEN the Los Angeles Steamship Company purchased the steamer City of Los Angeles she was powered by twin screw reciprocating engines. At the time of her reconditioning, in 1924, at the Los Angeles Shipbuilding and Drydock Corporation she was fitted with geared turbines. The speed of her tail shaft was increased from 80 to 130 R.P.M. by this change, and of course new propellers were necessary. Under the changed conditions there was more or less vibration noticeable when the vessel was making her schedule speed of 16 knots. The owners, always on the alert to have every comfort for passengers, retained William Lambie, naval architect of Wilmington, California, to design propellers to do away with vibration.

These propellers have now been in operation for several voyages and have shown splendid results. At first it was thought possible that the trouble with the original wheels might be due to synchronism between the natural period of the hull and the faster revolutions of the turbine operated propellers. No detail plans of steel construction being available, this question was investigated by the use of O. Schlick's constant figured for similar vessels whose characteristics were known. It was found that the first natural period of the hull would be somewhere between 86 and 91 revolutions per minute. Consequently it was decided that synchronism was not present, so the cause of the vibration must be looked for elsewhere.

The ship being turbine driven, there should be practically uniform torque on the shafting and no trouble was ever reported with the reduction gears. No vibration had been noticed when the vessel was operating with her original reciprocating engines, and so attention was directed to the changes made in the propellers at the time of reconditioning. When the vessel was lifted for installation of the first propellers it was noticed that the tips passed very close to the end of the bossing.

At the first annual docking thereafter opportunity was afforded to make a thorough examination of the vessel's form in wake of the propellers, which is shown very clearly in the diagram illustrated. This diagram shows the relative locations of the present propellers, bossing, and aperture; but it can be seen that with 15-foot diameter propellers having no rake the tips were passing a point on the hull about 9 inches forward of the aperture and cleared the end of the bossing only by 13 inches.

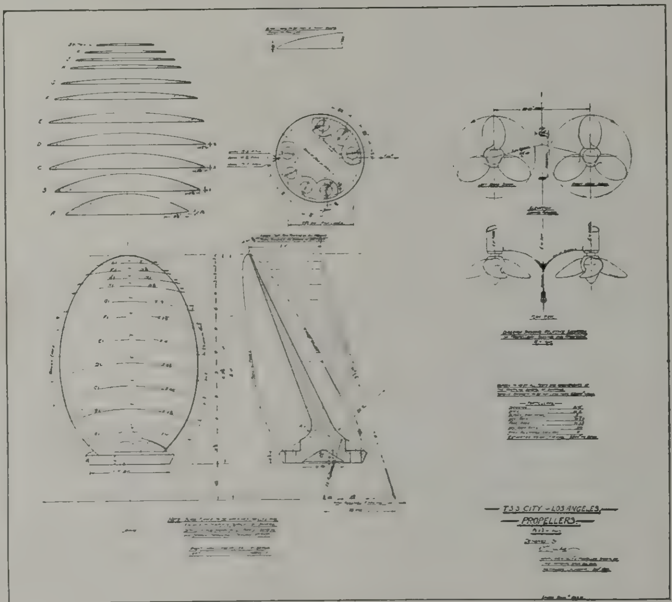
These conditions led to the supposition that the propellers were probably operating in a very strong wake; and a thorough analysis made of this question showed a wake fraction in excess of 0.50 while the propulsive coefficient was only 0.45, the former abnormally high and the latter somewhat low. A similar analysis was made of the data obtained with the original reciprocating engines, when the wake fraction was found to be 0.31 and propulsive coefficient 0.50.

It will be seen from the illustration that the bossing is only about fourteen degrees from horizontal, and the high wake fraction can probably be accounted for as follows:

When the ship is at speed, the water running along under the bossing will, when it reaches the end of the bossing, make an effort to follow the natural stream lines followed by the water running along the upper side of the bossing, and the stream lines at the end of the bossing will therefore be in a somewhat vertical direction. Owing to the upward angle of the bossing, fourteen degrees, this condition will be greatly accentuated close to the hull. Consequently, each time a blade passes this point it will momentarily be working in water whose velocity is somewhat in the same direction as its own, with the result that there will be less thrust on that particular blade than on the other two, which at this time are working in more solid water.

Remembering that the wake values as found above are an average of those experienced by the propellor as a whole, it follows that the blade when passing the end of the bossing will experience a wake very much higher than 0.50, while at the tip of this blade it must be very strong indeed.

Here it is interesting to note that the thrust on a propeller is proportional to the square of the speed of advance; so that it is not only quite possible, but is very probable, that the thrust on one blade at one part of its revolution may be very easily two or even three times that ex-



perienced at another part of its revolution.

It was therefore recommended that propellers be installed, whose blades raked back about 20 degrees so that their tips would pass the hull in the center of the aperture and would clear the end of the bossing by as great a distance as possible. This somewhat excessive rake back would cause an increase of stress on the blades of approximately 1800 pounds per square inch, and, it being found impractical to offset this by increased thickness and still use the same hub, it was decided to change the shape of the blade to the narrow tipped type so that the center of pressure would be as close to the hub as possible, thus materially lessening the bending moment on the hub.

The new propellers are one foot greater in diameter than those replaced while the root thickness is just ¼ inch greater; so that it was deemed necessary to further compensate by the use of special high tensile manganese bronze. The blades were manufactured by the Doran Brass Foundry Company of Seattle, who have the enviable record of never having had one broken propeller out of more than 700 in use.

These blades when tested by the American Bureau of Shipping, showed an ultimate tensile strength from 69,000 to 71,000 pounds per square inch, while the elongation ranged from 35 to 40 per cent.

That the analysis of performance, diagnosis of conditions, and resultant recommendations were correct has been amply substantiated in the results of the vessel's performance on her voyages between Los Angeles and Honolulu. From her logs it is recorded that she made an average of 16.2 knots per hour, and during one day 16.7 knots were made, with revolutions of 126 per minute. A material saving of fuel was also a feature of these records, though this may be in a measure attributable to the fact that the first propellers were of cast iron.

William Lambie is quite well known among the shipbuilders and naval architects of the Pacific Coast, having been with the Southwestern Shipbuilding Company of San Pedro for some five years. For several years he was engaged in experimental work at the research laboratories and model tanks of John Brown & Company, Clydebank, Scotland. Since he has started in business for himself he has made an exhaustive study of propeller design. Among several notable instances of increased efficiency made possible by the Lambie propeller might be mentioned the performance of the General Petroleum Company's tanker Los Alamos, which had been suffering from serious vibrations. This vessel was driven by two 750-horsepower McIntosh & Seymour diesels at 135 revolutions per minute. Lambie propellers entirely eliminated vibrations and also increased the speed by one-quarter knot over a six months average and at the same rate of fuel as was used before the change. Several Lambie propellers are in use on smaller craft out of San Pedro and San Diego on workboats, fishing boats, and tugs, and all are giving satisfaction.

Solid Injection Combustion System

(Continued from Page 509)

of the low temperature, and therefore it takes longer before ignition starts, a greater quantity of fuel is consequently injected into the cylinder and burnt suddenly under a corresponding increased pressure. The proper coordination of the compression and combustion lines and the quiet working of the motor depend upon increasing the temperature of the air at the end of the compression stroke to the highest possible extent, either by increasing the compression or, as in the case of these experiments, using moderate compression and taking advantage of the heat-storing effects of the piston mushrooms."

(To be continued)

Wire Rope, Its Use and Inspection

(Continued from Page 510)

reasonable to assume that visual inspection will detemine much along this line.

2. After wires are broken a dry cable is stronger than an oily one; the reason being that the internal friction when dry will tend to hold the wires together. However the oiling of cable is as important as the oiling of any machine.

3. A wire rope should be condemned when on a distance equal to eight diameters, more than 10 per cent of the total number of wires are broken; or when the wires are worn on the crown of the strand in an equal amount to 65 per cent of their original diameter.

Badly corroded, kinked, or deformed cable should not be subjected to heavy loads, but should be discarded.

The American Ship Florence

(Continued from Page 501)

In 1880 she took a cargo of wheat from San Francisco to Rio de Janiero in 72 days. In 1888 she made a side voyage, going from San Francisco to Sydney in 45 days and from the latter port to San Diego in 68 days.

With the discontinuance of coast to coast trade via Cape Horn, the fine fleet of sailing ships formerly therein employed found themselves without occupation and most of them were purchased by San Francisco interests during the late 90's for operation in the Pacific Ocean. Among those so transferred and becoming the property of the California Shipping Company was the Florence, which for a few years carried lumber from Puget Sound to Honolulu. Early in 1902 she left Tacoma under command of Captain Spicer who had been mate under Captain Ryder who had given up the sea to become marine superintendent for the California Shipping Company. No news was ever heard of her exact fate, but a year or so later a life preserver was found, and no doubt she foundered with all hands in the terrific storms that prevailed shortly after she had passed Cape Flattery. The H.M.S. Condor with 140 men and the steamer Matteawan also met their fate at the same time.

Pacific Workboats and Their Power Plants

San Pedro Workboat Notes

At Wm. Muller's boat building yard, Wilmington, California, work has commenced on a new diesel driven tug for the Wrigley interests. The four already built, with diesel electric power, are doing finely and exceeding the expectations of the operators. The latest vessel, however, is to be direct drive with a fully reversible, Winton diesel, on account of her size, being somewhat smaller than the others, and also because she will be more used for harbor work than as a deep sea tug.

The Seacraft Corporation shops, San Pedro, are kept busy on general repairs. R. B. Hawthorne, manager, says that there are several new jobs in the offing and he believes the outlook for more business is good. A recent visit to the yards showed full ways and berths, with several craft being overhauled and repainted. A force of thirty or forty men is kept busy.

Al. Larson's yard at Terminal Island seems always to have a fishing vessel hull on the ways or being put in frame. The latest is a heavy fisher workboat for Captain Manuel Rossa of San Diego. This vessel will be 99 feet in length, 22 feet 6 inches beam, and 9 feet 6 inches depth. She will be powered by a Western-Enterprise directly reversible, 6-cylinder, 300-horsepower diesel engine. Unlike other similar craft, her fish tanks will not be below decks, but will be built into her superstructure, thus ensuring better drainage and ventilation. William Lambie, naval architect of Wilmington, is the designer, and Pacific Marine Review will later show the working drawings of the vessel.

Mr. Larson has just delivered to the Stafford Packing Company of Wilmington a 68-foot combination purse seiner and cannery tender. She has a Western - Enterprise 110-horsepower diesel, and shows up as a speedy and able vessel.

Larson has also just finished the job of taking out a gas engine from the workboat Westerner, owned by Halfill Packing Co., of Long Beach, Cal., and replacing it with a 110-horsepower Western-Enterprise 4-cylinder diesel engine. Besides the jobs mentioned general voyage repairs and painting of coasters is going forward in the yard. Al. Larson made a trip North a few weeks ago in search of ship knees, and bought from Kruse & Banks, of North Bend, Oregon, over 400 of extra quality stock.

75-foot trawler Horizon, engined with a Fairbanks-Morse 120-horsepower diesel.

The Harbor Boatbuilding Company at Terminal Island, San Pedro, just signed a contract with Fred Jenkins, of Pasadena, to build a 70-foot twin screw cruiser. She is to be diesel driven, but high speed is not desired, rather a wide cruising radius and ability to take any sort of weather. She will be fitted with all modern improvements embodied in her type of vessel, such as refrigerator, shower baths, electric cooking rang, and commodious quarters, all finished in the best manner. The Harbor yard have recently delivered two fishing tenders for Japanese interests 75 feet in length and fitted with 110-horsepower Fairbanks-Morse diesels. On trials they made well over 11 knots and are able and staunch boats.

The fishing workboat Horizon, lately built by the Harbor Boat and Shipbuilding Co. of San Pedro, is 75 feet in length and 19 feet beam. She is of built up frame construction. A sister vessel of precisely the same dimensions but with bent oak frames, named the Pal, and built for the same trade by the same builders, was put into commission at the same time. Both these craft are fitted with Fairbanks-Morse diesels, directly reversible. Both are 4-cylinder, 120-horsepower engines, with driving propellers of same size and pitch. It was expected that the hull with the bent oak frames, being lighter, would make a higher speed, but as a matter of fact she was slower. At 350 revolutions per minute of engines, the built up frame hull made 9.4 knots, while that with the bent frames made only 9 knots. Both vessels carry 3000 gallons fuel and similar watertanks, etc. However, it is claimed that the bent framed one was slightly different in trim than the other, being rather less by the stern. This may have caused the difference.

The Southern Branch of the Fairbanks-Morse Co. report a good volume of business in their marine diesel engine installations the past several months, with future prospects good. J. N. Johnson, who looks after this part of the business, with headquarters at Los Angeles, is a practical and technical engineer. He is always ready to assist prospective owners and others interested in marine matters along the lines of diesel engine power for workboats.

Fellows & Stewart, of Wilmington, Calif., are very busy. The senior member of the firm, Joe Stewart, says they are way behind in their orders and need 20 more boatbuilders in the yard, although 50 men are now employed.

Joe has just returned from an overland cruise to Chicago and was much impressed with the marvellous activity of the boatbuilding industry there. He made the run to Chicago from Los Angeles in eight days in his land speedboat enjoying the change from salt water very much. At this writing Joe is building for his son, Joe, Jr., a cruiser of 31 feet in length and 7 feet beam, which he is certain will exceed a speed of 45 miles per hour. As she is to have a 375 special built Liberty motor and is well lined, she probably will make it. Joe Jr., 20 years of age, is now at the college of naval architecture at Ann Arbor, Michigan, and the new cruiser is of his design. Joe, Sr., keeps the young fellow posted in progress of the work by semi-weekly photographs.

A neat workboat built for export by Anderson & Cristofani at Hunter's Point, San Francisco. Two of these boats, designed by A. W. Lawson, San Francisco, and powered with 50-horsepower Gray gasoline engines, were recently shipped to Manila.

San Diego Workboat Notes

The fishing industry of San Diego is a considerable factor in the activity of workboats; but, in addition, many of the small power vessels are employed in towing and excursion jobs. Quite a large fleet hails from the port, the most southerly one on the Pacific Coast of the United States. This fleet keeps busy a number of boat yards and marine engine shops. A Pacific Marine Review representative recently visited several of these plants.

A. R. Robbins Marine Engine Works, Inc., at 1735 Atlantic Street, San Diego, in addition to machine shop work, have built seven small craft at the boat yards since the first of the present year. These were mostly fishing vessels of from 50 to 75 feet in length. At present they have on the ways a 70-foot fishing vessel for the Mexican Coast, which will be powered by an Atlas-Imperial 125 horsepower diesel. The hull is built with bent oak frames, and the fore and aft timbers are exceptionally heavy to carry the engines. Comfortable quarters for the crew will be provided, as these little craft make voyages down the Coast and up the Gulf of California extending over periods of several weeks.

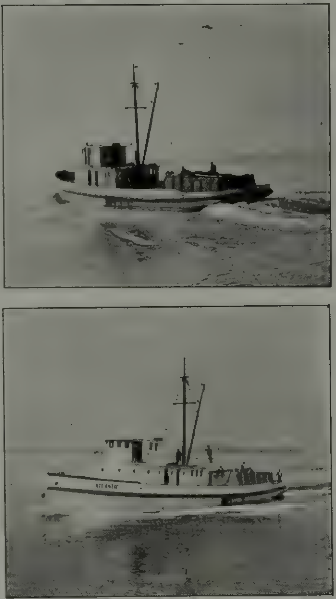
The Robbins yard has three hauling out ways and all facilities for quick repairs of hulls up to 100 feet in length and 13 feet draft. The seagoing fishing vessel Uncle Sam has lately been hauled out there to have her bait boxes removed from the lower hold and new ones built on deck. This will give greater capacity for fish storage. The officers of the A. R. Robbins Marine Engine Works are A. R. Robbins, president; Ira A. Robbins, treasurer and secretary, and H. B. Claflin, purchasing agent.

The Campbell Machine Company, of which George Campbell is manager, with machine shops at the foot of Eighth Street, San Diego, also have a boat and shipyard at the foot of Juniper Street. At the former place they do a general machine business of all kinds in addition to marine installations and overhaulings.

Since the first of the year eight hulls have been built, and at the new yard there is now on the ways an 85-foot fishing vessel for Jose Monise, which will have a 225 horsepower directly reversible Union diesel engine installed.

The Atlantic, a fishing vessel for Mexican offshore work, is a recent output of the Campbell yard. Two views of this trawler, obtained by a Pacific Marine Review representative, are here reproduced for the first time. They show her to be a staunch and able appearing vessel. It will be noticed that her bait boxes are on deck, a plan recently innovated and proved to be a great success in these craft.

This yard is preparing to build a heavier marine ways on which craft up to 125 feet in length and of almost any weight can be hauled.



Two views of the trawler Atlantic, built by the Campbell Machine Company of San Diego for offshore fishing in Mexican waters. The Atlantic is powered with a Union diesel engine.

The San Diego Marine Construction Co., foot of Sampson Street, San Diego, was started to attend to the marine work of the Star & Crescent Company of the same port, who operate a big fleet of excursion, taxi, speed, and work boats. However, for some time past this Yard has taken on jobs for outsiders and has built seven workboats since the first of the year, of from 40 to 85 feet in length.

A force of 35 men is constantly employed, and at times over 80 men are at work. There are seven hauling out ways connected with the yard, and vessels up to 175 tons can be handled. R. L. Prewett, naval architect, is manager and in general charge of the yard, while the Star & Crescent Company is looked after by Oakley J. Hall, president of both firms.

An interesting feature of the shipyard is an electric welding machine built on the job by the mechanics under direction of Mr. Prewett. This unit is powered by a Star gas motor, direct connected to a generator, rewound at the yard for the low voltage and high amperage necessary in this class of electrical output. The machine is mounted on a portable but rugged platform, and compares very favorably with units costing around eighteen hundred dollars. Close account of time and material was made of this locally built job, and cost was less than six hundred. In all departments around the place is noticed the results of good mechanical ideas and orderly arrangements.

George W. Beermaker, of San Diego, who operates the diesel workboat Gryme between that port and Mexican points, has added the gas workboat Presidente to his fleet. These two vessels are kept fairly busy with freight and passenger traffic, though during the summer season a great deal of this business is done by motor trucks. However, as the winter rains make the Mexican roads well nigh impassable, big business is expected for the water route soon. The Beermaker interests will probably purchase a larger vessel for this trade in the near future and it will be diesel driven.

The offshore trawler Vasco da Gama, built by the A. R. Robbins Marine Engine Works and powered with an Atlas-Imperial diesel engine.

An Interesting Shallow Draft Motor Tug

Successful Conversion of Old Stern Wheel Towboat on the Columbia River to Tunnel Stern, Screw Propulsion, with Atlas-Imperial Diesels

Picture of launch of Columbia River towboat Shaver after rebuilding.

FOR the last few months Pacific Marine Review has carried a number of references and some illustrations of the Columbia River towboat Shaver of the Shaver Transportation Co., Portland. This vessel has been creating a great deal of interest among engineers on account of her conversion from a stern wheel steamer to a twin screw tunnel-stern motor towboat. We therefore present now, through the courtesy of the Shaver Transportation Co., a more full account of the vessel and her performances.

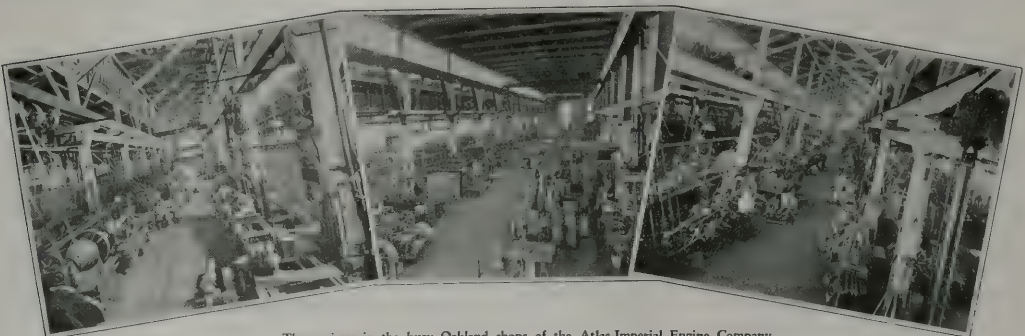
The Shaver has had a very interesting history. The hull and house were originally built in 1908. The machinery installed at that time was a set of poppet valve engines with 18-inch cylinder diameter and 7-foot stroke built by the Rand Iron Works of Cincinnati in 1859 for a river steamer called Chief, which was operated on the Red River during the Civil War. After the war she ran for a number of years on the Red River and on the Mississippi River, but early in the nineties she was tied up at St. Louis and was sunk. When the S. P. & S. Railroad built the North Bank Road down the Columbia River, they obtained the machinery out of the old Chief and installed it in the steamship Hanaford, which vessel operated on the Columbia and Snake Rivers helping in the building of the railroad. After the railroad was finished the Hanaford was purchased by the Shaver Transportation Co., who dismantled the boat and installed the engines in the Shaver in 1908. These engines performed very creditably up to January of this year.

In the meantime, the Shaver Transportation Co. had built the James W., as described in the October issue of Pacific Marine Review, a new tunnel stern, single screw towboat equipped with an Atlas-Imperial diesel engine. The success of the James W. was so pronounced that the company determined to experiment with some of their stern wheelers by installing new modern diesel engine plants and reconstructing the stern for tunnel screw propulsion.

The stern wheeler Shaver was chosen as the first boat for this experiment on account of her very sharp prow and her full bearing aft and amidships. J. H. Johnston, naval architect, marine engineer and propeller expert, laid out the design for the transformation of the hull and laid out a design also for the underwater fittings, shaftings, propellers, and steering gear.

The Shaver has now been in actual operation with her new machinery and transformed stern and has been giving very good satisfaction in towing lumber on the Columbia River. As an actual work trial trip, she went down the Columbia nearly to Astoria and there hitched onto two log rafts aggregating over a million feet. She brought these rafts up the river in as good time as she did before transformation and working at about 30 per cent under her rated horsepower. The speed of her engines on this tow at no time exceeded 208 revolutions a minute. On normal speed towing her rated revolutions are 250 and the engines were easily turned up to over 250 on trial, with a short tow. The fuel consumption on this trip was very economical and very satisfactory. The engines behaved very well and without the least trouble of any kind, and the vessel outmaneouvered anything she had ever done with the stern wheel steam plant. The testimony of the owners is that they are "very well satisfied with her performance and feel that she will out-pull and out-maneouver any vessel of the stern wheel type in the Columbia River District."

The propelling machinery of the Shaver consists of two 375-horsepower, directly reversible Atlas - Imperial diesel engines of the 6-cylinder, 4-cycle mechanical injection type, the cylinders having 13½-inch bore and 18-inch stroke. The main crank shafts of these engines are 8½ inches in diameter, the intermediate shafting 6 inches in



Three views in the busy Oakland shops of the Atlas-Imperial Engine Company.

diameter, and the tail shafts 6½ inches. The intermediate shafts are fitted with 19-inch Jones-Willamette spring bearings.

The propellers are 4-bladed, 68⅞ inches diameter, and 70 per cent pitch ratio. The steering gear is an interesting development, especially designed for the job by Mr. Johnston. There are four rudders, one forward and one aft of each wheel. The forward or monkey rudders are set above the shaft right in the tunnel. Gear for manipulating all of these rudders is controlled by a 12-inch Johnson-Fries pneumatic cushion gear.

A good supply of pure lubricating oil is insured by the installation on the Shaver of an electric motor driven De Laval purifier.

Auxiliary Machinery

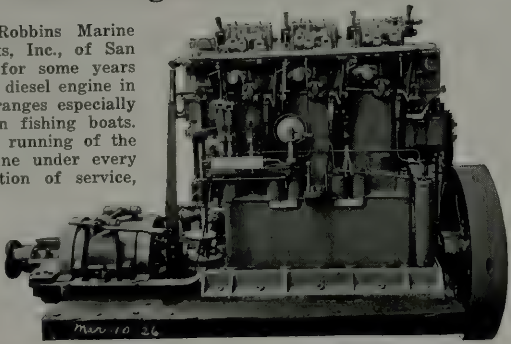
The deck auxiliaries on the Shaver are run by compressed air. Air is supplied by a 50-horsepower stationary Atlas-Imperial diesel engine driven air compressor. The arrangement of this air compressor is in three cylinders, the two outside cylinders being diesel power cylinders and the central cylinder the air compressor. A 10-kilowatt General Electric generator is driven off the flywheel of this auxiliary engine and a 7½-kilowatt Westinghouse generator is operated off the intermediate shaft of the port main engine. Two 12-volt Edison batteries handle the navigating lights. The towing winch is an 8 by 10 Willamette donkey steam winch converted for compressed air operation. The power capstan forward is operated by a 6 by 10 Hyde steam capstan engine converted for air operation.

All of the work of converting the hull and the installation of the machinery was done by the Portland Shipbuilding Company under the direct charge of C. Christenson and under the general supervision of H. T. Shaver for the owners.

It is reported that the Shaver Transportation Co. has under contemplation the gradual conversion of its entire fleet of stern wheelers to this more economical form of propulsion.

A New Diesel Engine for Small Powers

THE A. R. Robbins Marine Engine Works, Inc., of San Diego, have for some years been developing a diesel engine in the small power ranges especially suited to work on fishing boats. After three years running of the experimental engine under every conceivable condition of service, they are now placing this engine on the market in four sizes, 10, 20, 35, and 50 horsepower. Our illustration shows the 35-horsepower 3-cylinder unit with marine type reversing clutch. Six of this size are now installed on fishing craft operating out of San Diego, and the operators' reports on them indicate great satisfaction.



The Robbins 3-cylinder, 35-horsepower marine diesel, as installed in six San Diego fishing craft.

The Robbins engine operates on the solid injection principle with ignition entirely from heat of compression. The fuel consumption on tests shows as low as 0.4 pound per horsepower hour. The engine is designed for heavy duty, the rated speed and power being very conservative. Speed governing is very close, the governor working on the fuel supply and thus conserving fuel economy.

An interesting mechanical feature of this engine is that the fuel nozzle of any cylinder can be easily removed with the engine running. Compressed air is used for starting and is supplied by a gasoline engine driven compressor built by the Robbins shop. This auxiliary unit is of very compact design, being only 16 inches square at the base and 24 inches high.

The A. R. Robbins Marine Engine Works, Inc., believe that there is a good market on the Pacific Coast for a well designed, properly built, and reliable diesel engine such as they have developed, and they are prepared to manufacture this diesel and back its installation with expert engineering service.

Insulation Practice on Southern California Fishing Craft

OUT of the Port of San Diego, California, are operated many fishing vessels which cruise down to the waters off the Coast of Mexico, and up the Gulf of California in search of tuna, albacore, mackerel, and other varieties of fish. These vessels are for the most part about 80 to 100 feet in length and are powered by diesel engines. Their cruises sometimes continue over a period of fifteen to twenty days, so the problem of delivering the catch fresh and sweet to the markets is somewhat of a serious one.

Experience and experiment have brought about a system that is economical and effective. It is to thoroughly insulate the holds with cork or other proper insulating material and to have an air space between this and the ship's side. Then the insulation is covered with close fitted tongue and groove lumber and this again is sheathed with lead or galvanized iron, with all joints soldered water-tight and with proper drainage arrangements. The hold is divided into compartments, and one or two of these are filled with ice before leaving port. When the fish are caught a layer of crushed ice is spread in the empty compartment and the fish laid on this. Then a layer of ice is added and more fish, until the compartment is filled. It is then sealed up. The operation is repeated until all spaces are filled and the ice exhausted. The vessel then starts for port and is kept at her best gait until port is reached, where the fish is at once taken out and stored ashore or shipped in refrigeration cars to far markets.

When properly done this method results in the catch being delivered to the consumer perfectly fresh and sweet although not solidly frozen.

The principal operators claim that the method above described is in every way satisfactory. The real key note of success is in the employment of the very best insulation material and its application in a thorough and workmanlike manner. It is also known that a too severe freezing of fish often results in very rapid deterioration when thawed. A chill very close to 32 degrees will keep fish fresh.

Our picture shows one of the justly famous Venetian gondolas built by Michele Casal & Son of Venice, Italy. These dainty craft may now be obtained for California waters through A. W. Lawson of San Francisco

Auxiliaries—Ship Supplies—Marine Equipment

A New Development in Ship Fumigation

The Use of Cyanide Made More Effective and Absolutely Safe

By V. I. Safro, Chief Entomologist, California Cyanide Company.

THE tendency in ship fumigation, as in all industrial activity, is toward simplification and reduction of hazard. In the original process of cyanide fumigation, potassium cyanide was dropped into sulphuric acid, the reaction resulting in a violent evolution of hydrocyanic acid gas. This practice necessitated the employment of pots, tubs, or barrels and the use of sulphuric acid, the latter in itself constituting a great hazard and presenting a problem in the disposal of the residue after the fumigation. The occasional splattering of the acid, due to the violence of the chemical reaction, was also a serious drawback, because of its destructiveness to carpets, rugs and other floor coverings.

Because of its lower cost and at the same time equal effectiveness, sodium cyanide later replaced potassium cyanide. However, the objections which had prevailed against the latter were by no means nearer solution.

Then came liquid hydrocyanic acid, which has in some cases displaced sodium cyanide because of a greater economy in labor and the elimination of the problems of acid hazard and residue disposal, but its general adoption in ship fumigation practice is limited by a number of objectionable features. Chief among these is the possibility of explosion of the liquid, under certain conditions, while confined in containers. Such explosions have occurred at various times and have caused considerable damage through the action of flying pieces of tank, as well as the release of a tremendous concentration of cyanide gas. The shipment of liquid hydrocyanic acid is governed by very stringent regulations, its transportation by express being prohibited and by freight permitted only when packed in regulation I. C. C. containers. Many steamship lines refuse altogether to transport liquid HCN because of the hazard.

A New Chemical.

About a year ago Dr. F. J. Metzger, formerly professor of chemistry at Columbia University and at present vice-president of the Air Reduction Company in charge of research, developed an entirely new cyanide compound. He discovered that when liquid hydrocyanic acid is mixed with ordinary carbide a chemical reaction occurs which results in the formation of a commercially pure calcium cyanide. This commercially pure calcium cyanide, which is a fine, light brown powder, has the peculiar property of maintaining its strength in the unopened container and without any explosion hazard. Incidentally, ordinary drums of calcium cyanide are permitted transportation by express and freight without the restrictions applying to the liquid gas.

Upon exposure, this chemical reacts with the moisture of the air, resulting in the evolution of hydrocyanic acid gas. The degree of evolution is sufficiently slow, in practical use, to afford a wide margin of safety to the operator, and the spent residue, which is ordinary lime, is entirely harmless and easily disposed of.

The evolved hydrocyanic acid gas is exactly the same as that generated by means of the older methods, being non-injurious to metal, woodwork, and fabrics and safe to food products. Its efficiency, however, when evolved from commercially pure calcium cyanide is greater, inasmuch as the dust is distributed over a wider area than it is possible to locate pots or outlets of pipes leading from hydrocyanic acid pumps. This greater surface of evolution permits of more efficient diffusion. Incidentally, it is interesting to note that the gas evolving from commercially pure calcium cyanide is a slightly warm gas and that the diffusion, while taking place in all directions, is upward in its tendency. With liquid hydrocyanic acid the gas evolves as a very cold gas, and for some time remains in a layer on the floor, later, as it warms up, diffusing upward. With the pot method a hot gas is generated which generally shoots straight upward, where it may concentrate at the tops of enclosures until it has sufficiently cooled to diffuse downward.

Advantages.

In general, the distinct advantages which commercially pure calcium cyanide enjoys are its freedom from possible explosion; its elimination of the acid hazard and the pots, tubs, carboys, or other containers necessary when potassium or sodium cyanide are employed; the facility and safety with which the residue can be disposed of; and its greater penetrability and efficiency.

Fumigations with commercially pure calcium cyanide have been successfully conducted in flour mills, tobacco factories, warehouses, stores, and dwellings, and on railroad cars, cargo and passenger vessels, and ferryboats. While the general principles involved are similar for all types of cyanide fumigation, there are underlying factors which govern the adoption of different dosages and methods of treatment.

Dosage and Application.

The dosage of commercially pure calcium cyanide employed depends to a considerable extent upon the length of exposure—very often a limiting factor in ship fumigation procedure. Where the time element is not important and all-day or even longer exposures are permissible, the amount of material necessary is correspondingly reduced. The usual dosage is eight ounces per thousand cubic feet of space in cases where exposure can be made for a period of four or more hours The exposure can be so controlled as to cause minimum delay, and in extreme urgencies the actual fumigation may very often be reduced to as short a period as one hour.

In exceptional cases, where conditions permit, the commercially pure calcium cyanide is blown into the hold to effect a fumigation. This method, however, is possible of adoption only where the hold remains closed for a considerable length of time and where the presence of the dust throughout is not objectionable.

The usual method of fumigation calls for the laying of a strip of the powder on a paper runner in all enclosed parts of the ship. In the case of outside rooms it may be necessary to place a small sheet of paper on the floor and give each individual room a treatment. Of course, the usual precautions as to tightness must be observed, and windows and doors should be sealed with pasted paper strips. Where an entire deck is fumigated the hatches should be battened down and covered to prevent leakage of the gas. At the end of the fumigation the doors and windows are opened and the fans started, and when sufficient gas has been cleared out the operator can enter and gather up the paper runners with the residue, which is then burned.

The distribution of commercially pure calcium cyanide upon the paper is effected by means of a spreader. This, in effect, is a perforated roller which is pulled along over the paper strip, depositing a thin layer of the powder upon it. The spreader is calibrated so that a measured amount can be dropped over a measured distance, and the required dosage, having previously been determined, is correctly and quickly applied. In the case of small fumigations a can with a perforated top holding three, five, or ten pounds of material is used by the operator, who merely shakes the powder out upon the paper by hand. This is quickly done, and the operator, working from the farther end to the outside, closes and seals the door behind him.

Under development at the present time is a generator designed to permit evolution of the gas without allowing the powder to pass through, the gas being introduced into the ship by means of a hose or pipe.

A Recent Development.

The fumigation of ships with commercially pure calcium cyanide has received hardly more than an introduction. The Southern Pacific Railroad Company has fumigated some of its ferryboats at San Francisco by this method, and a number of ships in the San Francisco Bay district, as well as in the East, have been fumigated. While the greatest activity is occurring in what is popularly termed industrial fumigation—that is, those industrial fields that have insect or rodent problems that can be met with fumigation—the adoption of this new method of fumigation in shipping is making definite headway.

As a rule, the fumigation of ships contemplates the control of such pests as roaches, bedbugs, rats, and mice in rooms, holds, galleys, and quarters. However, fumigation is also resorted to for the control of pests specifically attacking, or likely to attack, cargo. Sometimes infested material taken aboard is fumigated in order to prevent multiplication of the insect pests concerned and to halt further damage. In some instances, as the result of a previous infestation, the hold will contain a great many insect pests that may endanger a later cargo, and it may be advisable to fumigate the vacant hold before reloading. Claims are occasionally made charging insect damage to shipments caused by infestation from pests occurring in the hold.

Food products such as dried fruits and vegetables, furs, hides, and leathers, woolens, and even wood products may be infested with insect pests that are easily controlled by calcium cyanide fumigation.

Moses Barker and John Crane Packing

MOSES Thomas Barker, known along the San Francisco waterfront as Mose, has a wealth of experience in marine engineering. Some forty years ago he was born in North Carolina and is of old time American stock. After a district school education, at the age of sixteen, Barker was cadet engineer on the steamer St. Paul of the American Line. After a year of this he entered the Newport News Shipbuilding & Dry Dock Co.'s works to complete his apprenticeship as marine machinist. About 1905 he began sea work again and was oiler, water tender, and third assistant engineer the next three years on steamers of the Old Dominion, Morgan, Guffey Oil Company, Alaska Steamship, American-Hawaiian, and Pacific Mail companies. Then in 1910 he began as second and then as first assistant on Pacific Coast vessels, putting in three years at this duty. He then joined the shoreside force of the Union Plant of the Bethlehem Shipbuilding Corporation in 1913 and worked there for about a year, when the call of the sea pulled him back as chief engineer of different vessels. In 1918 Barker joined the United States Shipping Board as chief engineer of the steamer Courageous, and later had a couple of years duty as inspecting engineer for the Shipping Board. From this to chief engineer, for four years, with different firms on Pacific Coast, and then to responsible positions as foreman and superintendent engineer for the Bethlehem Shipbuilding Corporation, San Francisco, and Crowley's Shipyard, Oakland, he became later associated with the Pacific Mill & Mine Supply Co., 616 Mission Street, San Francisco, as their marine representative, which position he now holds.

Moses T. Barker

Certainly Barker's wide and varied experience, as outlined above, gives him inside knowledge of the needs of marine engineers in the matter of stores and equipment. This knowledge, added to an ability to make friends, of whom he has many, is a valuable asset to the firm employing him. Mose says the goods he sells are of the best. Among the many lines of engine room necessities handled by the Pacific Mill and Mine Supply Co. are John Crane metallic and semi-metallic packings, as well as the well known John Crane condenser tube packing. This latter is claimed to be the last word of its kind. Easily put in any standard condenser, when once there will stay and keep the tube ends tight. It has been used extensively on the Pacific Coast as well as in other parts of the world, and satisfaction always follows its use. Heat and decay seem not to harm it, and the worry of leaky condensers is said to be over when these packings are in place. Mr. Barker has just recently packed with John Crane condenser packing his 23rd condenser.

Many other aids to effective operation of engine rooms are also pushed by Barker. Among these is the Rub-Steel valve. This is a valve with a sheet of steel moulded into a special rubber compound, to such form and size as desired. It is asserted these valves never wear out. This seems a strong statement, but is perhaps relative. For it is certified to that the Rub-Steel valves have been put into service and held up for over three years continuous work, where other types fell down in two months.

Another line boosted by Barker is the Valdura protective paints. He claims, and backs his claim by figures, that Valdura products will give complete satisfaction.

The experience of Mr. Barker is at the call of all interested shipowners and marine superintendents.

Wood in Plastic Form

VERY frequently the skippers and engineers of yachts and ships which are of wooden construction or which have wood trimmings are at a loss for the making of small repairs in woodwork, such as filling up of dents, small holes, or chipped off portions of moldings. A new material has appeared on the market known as Plastic wood, which seems to be excellent for this purpose.

Plastic Wood is in reality wood in a plastic form. It comes in cans packed ready for use and may be used for the repair of any wooden or ceramic article. This material adheres perfectly to wood, metal, porcelain, or tile. On exposure to the air it hardens into wood and can be worked with tools or finished with sand paper in the same way as a piece of hardwood.

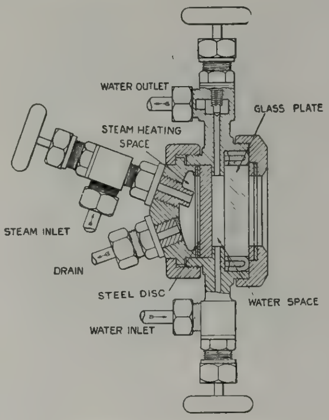
As an engineer, if you have broken off the wooden handle of your screw driver, or if you want to make a new handle for a knife or for an electric switch, these articles may be readily molded from plastic wood and finished to suit, just as if they were the original wooden item. In short, in plastic wood you have material which handles like putty and hardens into wood.

Plastic wood is manufactured by the Addison-Leslie Company of Canton, Massachusetts. It is distributed in San Francisco by the Barg Lumber and Shipping Co., 16 California Street.

Visual Detection of Corrosion

IN these days of keen competition in the shipping business, it is becoming more and more necessary that efficient, scientific management shall be practiced in the engine rooms of our freighters and passenger vessels. There are many devices on the market which aid the marine engineer in practising economies and minimizing maintenance, and new devices of this nature are being developed by marine engineering concerns as the need is apparent.

The firm of G. and J. Weir, Limited, Cathcart, Glasgow, are among the most experienced manufacturers of marine engineering specialties in Great Britain. The complete line of this firm is distributed in the United States and the majority of their specialties are manufactured here by the Bethlehem Shipbuilding Corporation. Among the Bethlehem-Weir specialties to which our attention has been recently directed is the Corrosion Detector, a cross section of which is shown herewith.



The Bethlehem-Weir Corrosion Detector

This is a very simple, comparatively inexpensive fitting, which allows a visual observation of the corrosive action of feed water and enables the engineer to quickly detect the condition of feed water at any given time. The corrosion detector consists of a chamber through which feed water is passed on its way to the boiler. One side of this chamber is composed of a glass plate and the other of a polished steel disk. Back of this steel disk, which is held in place by a set screw, is a chamber connected with live steam, so that the disk is kept at a temperature considerably higher than that of the feed water. If the feed water is corrosive, the action can be observed through the glass plate and usually takes effect very rapidly. If the feed water is noncorrosive, the disk will retain its polished appearance.

The complete apparatus is supplied in a neat wooden case and consists of one detector, complete as described and illustrated, with a test plate inserted, a steam inlet valve, water inlet valve, and 12 spare polished steel test plates.

This fitting is so simple and so easy to operate that it would seem wise insurance on the part of shipowners to have this equipment in use in every boiler room.

The Super-Lift Tructor

ANNOUNCEMENT of the Super-Lift Tructor is made by the Elwell-Parker Electric Company, Cleveland, as the latest addition to the mill type series.

This tructor is driven by storage batteries delivering power through Elwell-Parker drum type controllers of new design to Elwell-Parker motors. The machine weighs, complete with battery, approximately 6100 pounds and not only transports 20,000 pounds but picks up this enormous load and sets it down at destination electrically.

The design of the lift mechanism and drive is a refinement of the standard Elwell-Parker practice using higher grade materials and a perfected system of forced lubrication to all pin bearings. The lift motor is fitted with a special electro-mechanical brake and the entire lift mechanism can be removed, as a unit. Control of the lift motor has automatic trip at upper and lower limits. Both main drive and lift controls automatically return to "off" position and brake is automatically applied if operator steps or falls off.

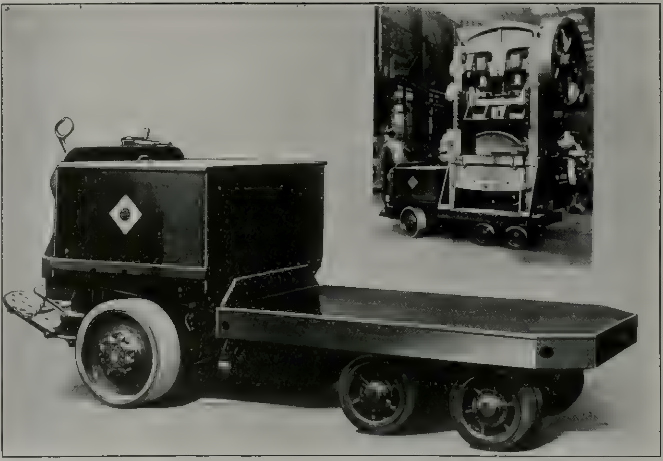
The main drive unit is heavily built with disc wheels on 7-inch double row ball, radial, and thrust bearings and carrying special 22 by 6-inch solid rubber tires. The three-point axle carries frame on dual coil springs. The axleways are self-lubricating and fitted with renewable linings. Practically every moving part, from motor shaft to drive wheels, is of alloy steel and this includes a drop forged brake drum. The entire power plant is removable as a unit.

The frame is of heavy construction but it, like every other part, has been designed to keep the weight at a minimum by employing better materials even at greater cost in order to conserve battery capacity.

The over-all efficiency of this tool is one of the outstanding features since it carries more than three times its weight and travels at a rate of 300 to 400 feet per minute.

About a year ago the first of these machines was designed, built, and delivered to a large automotive concern in just 66 days and operated so successfully from the very start that the fleet has now grown to be one of the largest. Fifteen of these machines have seen more than six months service with not a single weakness developing to date.

Handling heavy machinery, beams, plates or equipment at shipyard is all in the day's work. Hauling heavy cases of boxed machinery, motor cars. and the like from car (for they may be driven inside a box car) to shipside, can be done easily, safely and quickly.



The Elwell-Parker super-lift tructor will pick up and transport 20,000 pounds. Note inset.

Authority on Strength of Materials Joins Haskelite Staff

PROFESSOR O. H. Basquin, for twenty-five years on the staff at Northwestern University, has resigned from the faculty to take charge of the engineering department of the Haskelite Manufacturing Corporation with headquarters in Chicago. He has been acting as consulting engineer for this company since its organization.

Professor Basquin's principal interest in his own graduate work and in his teaching and research work has been in the field of strength of materials. One subject that attracted his attention particularly was the so-called fatigue phenomenon of metals. When the National Research Council appointed an advisory committee on this subject toward the close of the war, Professor Basquin was made a member of the committee, the work of which is now drawing to a close. He has presented papers before the Western Society of Engineers on related subjects and, as a result of ideas submitted to the Bureau of Standards, was invited to spend the summer of 1916 at the Bureau in Washington studying the results of tests on steel columns.

Professor Basquin has always recognized that the theory of strength of materials is approximate because of difficulties involved in a rigid mathematical treatment and also because materials involve imperfections not recognized in the theory. He has spent a great deal of time in studying out means of making tests which will verify the theory and devising apparatus to be used in such tests.

His experience in this line will peculiarly fit him for the problems he faces in connection with the production and application of Haskelite, the structural plywood, and Plymetl, its steel faced companion. Most producers of plywood are interested primarily in its beauty as applied in furniture, cabinet work, etc. The Haskelite products, however, are used for a wide variety of applications where known physical properties are the first requisites. The process of production in the Haskelite plant must, therefore, be carefully safeguarded to insure absolute uniformity in strength, weight, and other properties. Professor Basquin will devote considerable time and effort to this phase of the company's work.

Professor O. H. Basquin

Other important problems which he will help solve have to do with the application of Haskelite products in the various fields such as aircraft, marine construction, street cars, buses, commercial bodies, clothes vaults, and refrigerators.

Some Recent Subcontracts for the Malolo

THE contract for a complete manual fire alarm system for the steamship Malolo, now being built by the Wm. Cramp and Sons Ship and Engine Building Company for the Matson Navigation Company, has been placed with Charles J. Henschel & Co. of Amesbury, Massachusetts.

This manual fire alarm system will consist of 20 stations, one pilot house indicator with 20 indications, and one engine room indicator with 20 indications. This system is so designed and installed that it is under electric supervision at all times and any damage to any circuit or lack of electric power supply to a fire alarm box will be instantly announced at the wheel house. Each alarm box is equipped with a pilot light and is so designed that the breaking of glass cover will automatically turn in the alarm up on the bridge, at the same time indicating from which box the alarm was turned in. A small hammer on a chain will be attached to the box for the purpose of breaking the glass.

In the wheel house of the Malolo there will be two groups of alarm signals, one of red for fire alarm signals, and the other of green for trouble signals. All fire alarm signals will be automatically announced on a separate annunciator in the engine room. Whenever there is any trouble or short circuit, or a pilot lamp should go out at any fire station, it is immediately and automatically announced in the wheel house by a buzzer.

Electric Grates

Special electric grates have been contracted for with the Osterhout Electric Corporation of Philadelphia, for the library, social hall and smoking room of the Malolo. These grates are to give the perfect effect of a glowing coal fire, but at the same time are entirely operated by an electric current.

The electric grate for the social hall will be of Louis VI design in black iron with brass trimmings. In the library, it will be of Adam design in black iron and brass; and the smoking room will have Georgian design with similar trimmings. Each of these grates will correspond in design with the chimney place and the general decorative effect of the saloon in which it is installed.

Deck House Windows

The Kearfoot Engineering Company of New York has received the contract for installing deck house windows for the B and C deck staterooms and foyer on the navigating bridge deck of the Malolo. There are 213 of these windows, each with vertical sliding and rectangular opening with clear plate glass. All these windows can be opened on the inside of the stateroom, being raised or lowered by rotating handle. The operating handle inside the stateroom will be of polished metal, while all gear and window tightening devices will be of bronze and so made as to insure water-tightness and prevent the rattling of the windows.

Canvas Runners

One of the largest orders for canvas runners ever placed for an American built ship has been awarded to Gimbel Brothers of Philadelphia for use on the steamship Malolo. There is over one-half mile of canvas runners necessary to equip this vessel. These runners will be used upon the navigation bridge deck, A deck, B deck, C deck, D deck, and E deck. They will be laid in over 100 passages and rooms of the steamship.

Storage Batteries

The contract for equipment for the storage battery and control switchboards for the emergency line and interior communication system of the Malolo has been placed with the Electric Storage Battery Company of Philadelphia. The weight of the main storage batteries required is three tons. These batteries are only for the emergency lighting system. The interior communication system calls for three storage batteries that will weigh three-quarters of a ton, each will be under the control of a separate switchboard.

Rigging

The contract for rigging, consisting of wire, manila and hemp, for the Malolo has been awarded to Arthur N. Taylor of Philadelphia, who will install one complete set of running and standing rigging, including all guys and stays for funnel and all other sections of the boat requiring same. It is of interest to note that forty blue prints of rigging design are necessary for this equipment.

The boot and shoe shine equipment chairs for the Malolo will be furnished by Kramer & Sons of Philadelphia. This equipment will consist of special chair stand especially adapted for ladies and will carry two arm chairs of special and comfortable type. The whole equipment will be in mahogany finish with brass foot rests. The upholstered seat and back will be of leather.

An Improved Platform Sling

ECONOMICAL handling of freight for vessels is a big factor in keeping red ink off the books. When in addition to this is added freedom from breakage even better returns are assured. Ralph W. Myers of Hobbs, Wall & Company has put into practice improvements in platform slings by which the objectives mentioned above are practically accomplished.

The new system is made up of a platform, on which 100 cubic feet of cargo, either boxes, bales, or sacks, is easily loaded, as the first unit. This platform is built of 1¼-inch by 12-inch planks, 48 inches long, laid on and strongly fastened to two 4 by 10-inch timbers. The whole forms a portable loading base. Between the two 4x10 pieces, which are spaced to give 32-inch clearance, can be run a lifting truck by which the load can be hauled to any point desired for storage or spotted for loading aboard ship. Hoisting is done with wire slings, fitted with 4 by 6-inch spreaders at the lower ends and corresponding ones about seven feet up. The two lower spreaders are passed under the ends of the platform planks and the whole load is thus taken on solid stuff, clear of all fastenings. The upper spreaders keep the slings from pinching the load. The whole arrangement is very simple, its main features being the sturdy construction calculated to hold up against rough treatment by stevedores.

The use of these platform slings has speeded up loading from 28 tons per hour to 45 and 50 tons, and breakage is decreased to a minimum. The number of sacks of flour handled per load has increased from 15 with old type slings to 30 with the improved ones, and with no torn sacks, such as were always in evidence with the old type slings. Teamsters bringing truckloads of freight to the piers can load directly onto these platforms instead of piling packages, thus saving much handling and attendant expense and waste. Especially in shipments of boxed fruit is this type of platform sling advantageous. Also when lowered into a vessel's hold the loads can be hauled forward or aft by the lifting trucks, and easily stored.

The wire slings for lifting are of ⅝-inch material, and the splices at the eyes are served to be the easier handled. Two men can take care of this sling with ease, and the stevedore gangs seem pleased with it, as their work is made lighter.

A New Belt Lacing Pin

EVERY year, in the United States alone, one hundred million power transmission belt lacings break. Every year one hundred million dollars is paid out by industry for belt lacing repair expense. And every year the problem of finding a really satisfactory belt lacing pin becomes more pressing. It is a problem, both figuratively and literally, of the missing link in industry.

Such a missing link, if any one may judge from reports of its performance, has been supplied by the Detroit Belt Lacer Company in its manufacture of the Detroit-Bakelite pin. This pin, wherever it is in use, appears to be surpassing the ordinary rawhide product — one Bakelite pin sometimes outwearing as many as eight rawhide pins when run under the best conditions in the same belt. The Bakelite pin has also the added advantage of resistance to moisture, oil, or acid. It was developed by Frank W. Knott, transmission engineer, now president of the Detroit Belt Lacer Company.

Any user of belting realizes the tremendous improvement of modern wire hook belt lacing over the old-time rawhide thongs. After the conception of the staggered grip wire hook lace came the building of automatic machines for its manufacture. These hook production machines were the first step toward modernizing the transmission of power. Taking the wire from mill coils and the paper from rolls, they point and form the hooks, space them, attach them to the coated paper, and cut them into 12-inch lengths ready for packing.

The choice of wire was a special problem. It had to be stiff, yet adapted to automatics—hard enough to withstand wear, yet free from crystalization. These qualities were, in time, developed. Then came, with further research, a new coated wire, far more rust resisting and durable.

About five years ago Mr. Knott began to realize that there was yet one more step to be taken before the problem of belting was completely solved. He began to realize the inherent weakness of rawhide as a coupling for the lace. Belt lacing pins had originally been made with binder twine, which was by no means satisfactory. Then came the rawhide pin, the best variety of which was made from the hide of the water-buffalo of India.

In spite of the greatest manufacturing care, however, many pins were too soft, too supple, too "spotty." As a result, the pull on the hooks was uneven, throwing undue strain on some and relieving the others. The hooks cut into, and sometimes through, the rawhide.

A broken pin has always meant a broken belt, with consequent loss of time and repair expense. A pin that has been cut or worn also means much loss of time in taking up slack. Tests have recently been conducted which indicate that one-half of the belt breaks in industry are caused by rawhide failure rather than by failure of the lace. It was evident, therefore, that before the new staggered wire hook lacing could carry one hundred per cent of its burden of industry, rawhide pins must be improved or replaced.

Attracted by the versatility of Bakelite products—products made, by a modern chemical miracle, from the union of phenol and formaldehyde—Mr. Knott turned his attention toward them. The application was not an easy one, for the qualities required in a belt-lacing pin differed greatly from those required in the numerous other uses to which the Bakelite products had been adapted. The Bakelite resin, however, possessed the fundamentals; and after two years of continued trials and tests, the missing link was evolved.

The cost of the Detroit-Bakelite pin is about 50 per cent higher than that of a rawhide pin, but the resultant saving in time and repair more than outweighs the matter of initial outlay.

Praise for the Radio Compass

THE use of the radio compass as an adjunct to other modern devices used by mariners in piloting the course of their vessels during adverse as well as fair weather is causing considerable comment in maritime circles. Reports of the experiences of a number of steamship captains furnish conclusive evidence that the radio direction finder is fast becoming recognized by practical mariners as one of the most valuable instruments of marine navigation. In a letter to the Vacuum Oil Company in New York, which accompanied the log of a recent trip on the Pacific Coast, K. I. Marcussen, master of the steamer Gargoyle, stated in part:

"I wish to add that coming up the California Coast in dense fog, I found this apparatus to be of inestimable value. As soundings are impractical on this steep coast, with great depths a short distance off the beach, I had this to fall back on, and by taking a number of bearings off Point Sur, at about 10 minute intervals, I could tell, not only that we were well clear, but also by applying my speed, could tell the distance off, and the minute I had that point abeam.

"This apparatus, in conjunction with the gyro so bearings can be read off true, is by far the greatest aid to navigation in fog. No uncertain guessing about it, and when you know you are right you can go ahead and delays on account of fog are practically eliminated."

At the offices of the Radio Corporation of America, in New York, T. M. Stevens, marine superintendent, said the Vacuum Oil Company had equipped twelve of their largest vessels with the radio compass.

Purchasing For Marine Department

Methods for Purchase and Control of Supplies and Equipment for the San Francisco Bay Ferryboats of the Key System Transit Company

By Wayne Allen, Assistant Purchasing Agent, Key System Transit Company.

Wayne Allen

PURCHASING for the boats of the Key System Transit Company is accomplished by the centralized purchasing department of the company in identically the same manner as the buying for the street and interurban railway properties. In describing the method of purchasing for the boats, the general scheme of purchasing and method of stock control must be explained.

The Key System purchase and stores department is organized as a single department with purchasing and storekeeping practices adopted from the standard established by the American Railway Association and the American Electric Railway Association. All purchases of whatever nature are made on the quotation or bid system. A few commodities are purchased on contract, all reputable firms being requested to furnish prices for delivery of known requirements over a fixed period.

The Key System Transit Company has four main stores, numbered from one to four. Store No. 1 maintains a stock of hardware, electrical parts, supplies, and castings, lumber, including hardwood lumber, rope, lamps, soap, cleaning materials, signal materials, and stationery. Store No. 2 maintains a stock of oils, paints, wire, line materials, and trolley poles. Store No. 3 maintains the stock of rails, ties, timbers, piles, building materials, including asphalt, and all materials needed in track or building construction or reconstruction.

Store No. 4 is at our Key System Pier in Oakland, and it is here that stores pertaining to our marine department are kept. This is the main store for materials used only on the boats, such as rope, lubricating oils, fuel oil, with a substore for a working supply of mazda lamps, liquid soap, toilet paper, towels, castings, electrical materials for electric trains and for our electric boats, cleaning materials, boiler compound, linoleum, paint, stationery, and all equipment and fittings necessary for regular operation of ferryboats. I will return to Store No. 4 later and describe method of disbursement of materials from this substore.

Specifications

As the Key System cannot afford to support an Inspection Department, purchases are not made from definitely prepared specifications as to content of materials or equipment. Certain standards of the American Electric Railway Engineering Association are specified on bids and orders, and in such cases the Robert W. Hunt Co., or other reliable inspection service bureau, is engaged to inspect and accept for the company. The chief engineer and his mechanical assistant, the superintendent of equipment for the entire system, have developed certain standards for the System in paints and other commodities. Paints, for instance, are known as K. S. T. Standard Paints, such as K. S. T. Standard Floor Paint, K. S. T Standard Roof Paint, and the purchasing department maintains a list of companies who have made up products for our use which have been tested and proved from use to be satisfactory.

The policy of the Key System with regard to specifications is that at least on alternate product, if equal, shall be listed in the specifications. The purchasing department assists in the preparation of such specifications by broadcasting price inquiries and selecting from reputation and/or price certain firms to submit samples for test. Exhaustive tests are made under the direction of the chief engineer, and his report becomes a permanent record of the purchasing office and specifications are prepared from these reports.

Many special articles and much special equipment must be procured for the marine department, and in many instances the material is needed quickly. If the need constitutes an emergency, an emergency order is issued, prices procured by telephone, and the order placed by telephone, the delivery then being made direct to our marine department at San Francisco. If an emergency occurs at night, when the purchasing agent or his assistant cannot be reached, the chief engineer has authority to procure the necessary emergency material. Explanation of all emergency orders is demanded.

Disbursement of Supplies

Supplies when drawn from storehouse are covered by requisition.

The storekeeper of Store No. 4 is also shipkeeper. Under the direction of the supervisor of marine maintenance, he charges out the material used each day by separate requisition to each boat or to the proper account number under a system of accounts prescribed by the Interstate Commerce Commission. These requisitions are then forwarded to the general storekeeper who posts the withdrawals from stock from a ledger containing all items used by the company. Requisitions are priced by the price clerk and one copy returned to the marine department that definite knowledge of costs may be had. Store No. 4 stock is replenished as required by supply motor flatcar operated under the direction of the purchasing department. Requisitions for purchases of materials from vendors or manufacturers or store orders for the manufacture of boat items in our own large shops are made from this ledger.

All materials are under the control of the purchasing department until issued for consumption. All requirements whether for material and supplies, or equipment, or repairs to equipment made by foreign companies are handled through the purchasing department.

In view of the close proximity of our general store at Oakland and the fact that our property is located near to the vendors, the stock maintained at our store No. 4 is not large, and the investment in marine stores is held to the minimum.

Marine Insurance

Edited by JAMES A. QUINBY

Concealment of Fact

It is elementary marine insurance law that the concealment of a material fact during negotiations for a policy renders the contract voidable by the injured party. The principle is so elementary, in fact, that modern cases based upon it are worthy of comment.

In the August, 1926, number of the Times Commercial Cases, at P. 289, appears the case of Greenhill v. Federal Insurance Company, in which the necessity for full disclosure is again emphasized.

In August of 1918, the plaintiff in that action wished to send a quantity of celluloid from New York to Nantes. In order to obtain protection from war conditions, the goods were shipped to Halifax on a vessel called the Julienne, there to join convoy for the transatlantic trip. The Julienne, being by nature a lake steamer, and heavily overladen, crawled northward at what the court terms a "magnificent speed of 3½ knots an hour."

On beholding the Julienne in all her glory, with her fuel exhausted and her load line still a foot under water, the commander of the convoy refused to include her in his harem, and she was left at Halifax, where she remained from November 18 to December 7, when her cargo was discharged and stacked in the open until the beginning of February.

On January 20, the plaintiff approached the defendant insurance company and effected insurance on the celluloid per the steamship Watuka from Halifax to Nantes, but, according to a preponderance of the evidence, he neglected to mention the previous trials and tribulations of the shipment. The court held that this constituted a concealment of a material fact, entitling the insurer to avoid his obligation under the policy.

"Insurance," runs the opinion, "is a contract of the utmost good faith, and it is of the gravest importance to commerce that that position should be observed. The underwriter knows nothing of the particular circumstances of the voyage to be insured. The assured knows a great deal, and it is the duty of the assured to inform the underwriter of everything that he is not taken as knowing so the contract may be entered into on an equal footing."

WINDOWS

Outside my window
Men pass by.
Down the horizon
Great ships ply
Out on their wonder ways
Seeking afar
Romance exotic,
Dream-gates ajar.

I am a listener
Deaf to calls.
I am a shore-dweller
Fettered by walls
Chained to earth bodily
Straining to free
The heart of me, part of me
Down to the sea.

To each man his window
Where visions go by.
Thus Fate makes amends
To such as I;
For what of the sailor man,
What dreams has he?
He longs to retire,
A landsman like me.
—J. A. Q.

"Hoping You are the Same---"

The w. k. Japanese Schoolboy himself might writhe with envy at the following communication, treasured in the files of a San Francisco underwriter.

Shanghai, 2nd Aug., 1926.
—— ——— Importing Co.
San Francisco.
Messrs,:

In respondence to yours of the last 28th, asking many questions about our June shipment, all we know is these grass mats were loaded from lighters, which were first hung up to dry and then rolled in bundles of six each.

The goods were delivered in order and condition to the ship. The same as the outside was the inside.

We are pleased to be of little service to you.

Yours faithfully,
Nakaibo Kisen Kaisha.

Try This On Your Broker

Well, well, children, now that we're gathered here in the nursery, and it's raining out doors, Aunt Aimee has a puzzle for your little minds to work on. Ready? Set. Bang!

Once upon a time there was a tall man with bushy whiskers, named A. Middleman, who had a contract policy with the usual conditions, including a provision that goods insured thereunder were to be valued and declared at "invoice value, including prepaid and/or guaranteed freight plus 10 per cent." On January 1, 1926 he bought a shipment of hides in Buenos Aires, and on the same day sold them to a New York buyer for a lump sum of $5000, agreeing to February delivery.

Shortly thereafter, while the hides were still at Buenos Aires, and before they had been loaded aboard the carrying vessel, there was a sharp rise in the market, and Mr. Middleman awoke to the fact that if anything happened to his precious cargo, it would cost him $8000 to replace it and fulfill his contract.

He therefore declared the shipment at a value of $8800. The underwriter received the declaration without comment and accepted the premium. The goods became a total loss by reason of perils insured against.

Mr. Middleman immediately presented claim for $8800. The insurer demanded production of the invoice. The invoice, when produced, showed an agreed resale price of $5000. The insurer contended that the contract provision as to valuation was controlling, and offered to pay $5500.

The assured pointed out that the actual value had been declared and premium accepted therefor; that he had insured his amount at risk, since his replacement cost was the measure of his possible damage; that the invoice was merely

Arthur M. Brown **EDWARD BROWN & SONS** *Arthur M. Brown, Jr.*
MARINE DEPARTMENT—*Harry W. Browne, Manager*
PACIFIC COAST GENERAL AGENTS
THE GLOBE & RUTGERS FIRE INSURANCE CO., INC.
200 BUSH STREET, SAN FRANCISCO

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA and SANSOME

JOSEPH HADLEY,
European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Resident Agent for Oregon
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, MANAGER, PACIFIC NORTHWEST BRANCH

evidence as to the insurable value; and if, under a long-term contract, he had been forced to sell repeated shipments at less than cost, it would be inequitable to refuse him the benefit of insurance on his possible loss.

What do you think?

Sounds Fishy

VERILY, the range of things connected with marine insurance grows wider each day. The uninitiated may think it a far cry from the California Fish and Game statutes to the provisions of a marine hull policy, but the two have been introduced, and, unless the minions of the law are too aggressive, or the spirit of the underwriters too weak, the acquaintance may ripen into a close companionship.

It seems that the legislators of the sovereign state of California, zealous in their efforts to protect the food fish of this glorious commonwealth, have decreed a limit to the activities of those whose business activities consist in transforming the finny host into fish meal, fertilizer, or what have you? The will of the people, as expressed in the general laws of the State of California, Act 2895, reads as follows:

> Par. 5. . . . It shall be unlawful for any person, firm, or corporation to buy or sell or receive or use any kind or species of fish fit for human consumption for reduction purposes except fish offal; provided, that any person, firm, or corporation engaged in taking, catching, or dealing in fresh fish or fishery products for human consumption, or any person, firm, or corporation engaged in canning, packing, or preserving fish for human consumption desiring to sell or deliver or use in a reduction plant any fish fit for human consumption shall file an application in writing with the fish and game commission setting forth the kind or species and quantity of fish to be sold, delivered or used in a reduction plant.

The act then goes on to provide for the issuing of a permit in certain cases, but specifies that such permit shall not divert to reduction purposes more than twenty-five per cent of the amount of fish which a given firm can pack or preserve for human consumption in any calendar month.

As exemplified in cases under the National Prohibition Amendment, whenever we pass a law we find plenty of people who want to evade it. In the present instance, a group of industrious fish reducers, whose names we shall delicately refrain from mentioning, are seized with an overwhelming ambition to turn out an unlimited amount of fish-meal. To do this it will be necessary to leave California soil. They might set up a plant in Nevada, a few miles east of the California line, and operate with impunity—but without fish. On the other hand, almost any given spot a few miles west of California is more or less densely populated by scaly denizens.

A plant is accordingly afoot—or under way—to fit up an old concrete tanker as a reduction plant, tow some three or four miles off Monterey, and proceed to reduce all the fish within reach, while figuratively thumbing the nose toward the California coast line.

The ex-tanker registers over 6000 gross tons and is 420 feet long. An attempt is now being made to insure her against hull risks.

She is undoubtedly large enough to reduce a lot of fish. If she is insured, she may also reduce a considerable number of underwriters. A concrete vessel, anchored offshore, with no propelling power, is very apt to find herself in close contact with the scenic beauty of the Seventeen Mile Drive.

But entirely aside from the practical elements of the risk, the attempt to evade the jurisdiction of the state presents some interesting problems.

It is true that the arm of the state is not as long nor as elastic as that of the federal government. Were a federal statute involved, the chilling words of the late Judge Partridge would whistle down the wind of memory to over-ride the puny distinctions of extra-territorial legislation. Even the state courts have not been loath to reach beyond their artificial limits when a manifest evasion of the law has been attempted. In Norman v. Norman, 121 Cal. 620, a girl of fifteen wished to marry without the consent of her guardian, contrary to the state law. She and her gentleman friend boarded a schooner, proceeded to a point nine miles off the coast, and were married by the master. The court held the marriage invalid.

In a similar case (Holmes v. Holmes, 1 Abb. U.S. 525) it was suggested that a valid ceremony might have been solemnized at sea on a voyage from a point in California to a point in Oregon. In the opinion, after holding that there was no valid marriage under the law of either state, the court said:

"Nor do I think that citizens of this state (Oregon), as the complainant and deceased were, can purposely go beyond its jurisdiction, and not within the jurisdiction of another state—as at sea—and there contract marriage contrary to its laws. Such an attempt to be joined in marriage is a fraudulent evasion of the laws to which the citizen of the state is subject and owes obedience, and ought not to be held valid by them."

Although the decisions above quoted have to do with marriage laws, rather than with fishing, there comes to mind no valid distinction in principle. In fact, certain masters of sarcasm have more than once indicated that the two sports have much in common.

The attempt to evade the law is open and apparent. The case is not similar to those insurances on liquor shipments between Vancouver and Guaymas, where the voyage is ostensibly legal. So even if our friends succeed in placing this interesting hull risk, they may find, in case of loss, that an unkind or embarrassed onderwriter will allege a breach of the warranty against illegality.

The Last of the Lyman Stewart

BUFFETED by the winds and seas of Land's End, San Francisco, haunted by tramps, small boys, and volunteer sign-painters, the battered hulk of the tanker

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Manager, Southern California Marine Branch
740 SOUTH BROADWAY
LOS ANGELES

CHARLES R. PAGE, Manager
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

309 COLMAN BUILDING, SEATTLE, WASHINGTON

Lyman Stewart must have gurgled a sardonic laugh at the news of the appellate court's refusal to grant a re-trial of the issues arising from her collision with the Walter A. Luckenbach on October 7th, 1922.

Almost four years ago to a day from the date these lines are written, the two vessels made their memorable effort to displace the same portion of the Golden Gate. Both were driving through a heavy fog. On the part of each there was the usual evidence of negligence. There was a crash, and the Lyman Stewart reeled back, stricken and sinking. Forty minutes later, after frantic efforts to procure assistance, she was driven ashore and became a total loss.

Since that time the phantom spirit of the Lyman Stewart, a veritable Flying Dutchman of the transcript, has re-enacted her death struggles amid the uncharted and turbulent waters of the federal courts. The list of counsel in the case might serve as a San Francisco outline of Who's Who in Admiralty. Hengstler and Dorr for the Luckenbach interests, McCutchen, Olney, Mannon and Greene for the Stewart, Derby, Single and Sharp for the Shell Oil cargo, and William Denman for other cargo interests, all had a hand in the case.

Judge Bourquin of the District Court found that both vessels were to blame, but was so strongly impressed with the idea that the Lyman Stewart might have been saved by good seamanship after the collision that he limited her recoverable damage to that existing immediately after the crash, and before she went ashore.

The Lyman Stewart and her cargo naturally appealed from this decision, and the Circuit Court of Appeals sustained the appeal, holding that the collision was the proximate cause of the final loss.

"As to the Stewart," says Judge Rudkin, delivering the opinion, "it was conceded that she was cut through both above and below the water line and was filling rapidly. Her bow was under water as far back as the bridge, and this condition was relieved but little by pumping oil from the cargo tanks. Her opportunity to take a line from either vessel was by no means clear. The master of the Walter A. Luckenbach testified that it would take at least an hour to extend a line from his vessel, and the Stewart was stranded well within that time. Furthermore, when asked for a line he proceeded into port and left the Loop to stand by. According to the more definite and creditable testimony the Loop appeared on the scene just as the master of the Luckenbach was reading the message from the Stewart at 3:46, and, whether the Loop remained two minutes or five minutes, it is safe to say that she was in no position to render aid before 3:50. The engines of the Stewart were put astern at 4:00 o'clock, and it is conceded on all sides that the time for giving aid had then passed. It will thus be seen that the Loop had but ten minutes within which to extend a line to the Stewart, and it would have taken all of that time to do so under the most favorable conditions. The master testified that he was afraid to go ahead on his engines lest it would drive his ship to the bottom of the sea, and that he was afraid the like result would happen if he dropped anchor in the swift current.

The question then arises, is the master to be condemned? The problem confronting him was a problem of the sea to be solved in the first instance by seafaring men. We should not view the situation in retrospect or from the shore, but from the viewpoint of the master on the bridge of the crippled ship, charged with full responsibility for the safety of her cargo and crew. And, when viewed in that light, we must not only be able to say that the course pursued was wrong, but we must be further able to say that it was so illy considered and so plainly wrong that a competent navigator would have rejected it if placed in the like position. The master of the Lyman Stewart may have erred in the measures adopted to extricate his vessel from the perils in which she was placed by the collision, but if he did it was in our opinion an error of judgment only, such as any competent navigator might have committed under the like circumstances."

General Average Dispute Continues

THE animated discussion over the adjusting practice of waiving security, exempting uninsured cargo, and using insured values for contributory purposes still rages along the Rialto. The outline of the controversy was printed in these columns for September of this year, and since that time we have been pointed at with various fingers of scorn or admiration and either credited or charged with having instigated the whole affair.

We hate to deny the insinuation. It's rather flattering to our individual self-esteem to assume that we could stir up all that row unaided. As a matter of cold, prosaic fact, however, we had nothing whatever to do with it.

For some months previous to the appearance of the article in question, San Francisco insurers had been discussing the matter and had even gone so far as to bring the matter up before a meeting of the Board of Marine Underwriters. At least a half-dozen managers of San Francisco offices expressed themselves as opposed to the prevailing practices of adjusters. We are informed that the Board, acting through its Adjustment Committee, has since taken steps to standardize the agreements now in use and to report upon further possible changes in the system.

Many insurers believe that the evils attendant upon the "short-cut" method of adjustment are insignificant compared to the benefits gained, and that the uncertainty of the system, in regard to incorrect insured values, can be remedied by a greater degree of care exercised by the underwriters themselves.

Admitting the value of the system, the very fact that so much dust is being kicked up over it argues that it could stand a little revising. In the first place, some steps should be taken to regulate the age of cases invoked under this broad classification of pseudo general average. In the past, on at least one or two occasions, a shipowner has discovered, say a year after an accident, that his vessel had incurred unsuspected injuries while being hauled off strand. When she reached her port of discharge, he has neglected to take security, thinking that the expense was trifling.

But, at the annual overhaul, it is discovered that there are

Balfour, Guthrie & Company
(Established 1869)

MARINE INSURANCE

Agents for
AMERICAN AND FOREIGN
NORTH CHINA
UNION OF CANTON
QUEENSLAND
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BRITISH AND FOREIGN
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311 CALIFORNIA STREET, SAN FRANCISCO, CALIFORNIA

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INSURANCE
BROKERS FOR THE ASSURED—AVERAGE ADJUSTERS

facts, which, if known at the date of discharge, would have dictated a retention of the shipowner's lien on cargo for a contribution. In this situation, an attempt to obtain by agreement what could not be gained by exacting security is unwarranted. There may be some ground for saying that a cargo insurer contracts on even ground when he signs such an agreement prior to delivery of cargo, since his waiver presents an alternative to taking security, but after the cargo is delivered, and perhaps sold and resold, the consignee can no longer be proceeded against, in the absence of a bond, and any attachment of the cargo in rem is out of the question.

As the insurer's liability for general average expenditure is secondary in nature, why, in light of the above, should he incur an obligation which had never properly accrued to his assured?

Freights, Charters, Sales

October 19, 1926.

UNITED **Kingdom/Continent:** Parcels of wheat and barley by the regular lines are paying 40/- and now owners of tramp tonnage are holding for 40/-, Vancouver loading, and one barley cargo is reported today at 42/6 for U. K.-Continent.

Intercoastal Lumber: Owners of American tonnage are holding for $15.50, but we have not heard of any fixtures at that rate. Some foreign owners are offering tonnage at $14.50 but we have not heard of any such fixtures. Charterers are bidding for foreign tonnage, November, $14, two ports discharge, though possibly one port could be arranged at this figure.

Australian Lumber: There is no real demand for tonnage in this direction, though one or two steamers could be placed for November/December, if owners would accept around $13, two ports loading to two ports discharging.

Japan/China-Lumber/Grain: $11 has been done for one port loading to three ports discharging but charterers are now only bidding $10 for one loading port to two discharging ports Yokohama/Moji range.

The following fixtures are reported for grain to the U. K.-Continent: British stmr. Cutcombe, Oct., Kerr Gifford & Co.; Norwegian stmr. Kari Skogland, Oct./Nov.; Japanese stmr. Aden Maru, Oct., Cooperative Wheat Producers; Japanese stmr., 35/3, Nov.; Japanese stmr. 36/6, Nov.; British stmr. Clydebank, Italy, 38/9, Oct., Strauss & Co.; Japanese stmr. Portland Maru, Oct., Strauss & Co.; Japanese stmr. Portsaid Maru, Oct., Balfour Guthrie & Co.; British stmr. Jerseymoor, 35/-, Nov.; British stmr. Jersey City, 35/6, Nov., Wilmer Grain Co.; British stmr. Queensmoor, 35/6, Oct., Balfour Guthrie & Co.; British stmr Benvorlich, Nov., Kerr Gifford & Co.; Japanese stmr. Tofuku Maru, 35/-, Nov.; Japanese stmr. Yeifuku Maru, Nov., Canadian Cooperative Wheat Producers.

The following grain fixtures are reported to the Orient: Japanese stmr. Kokki Maru (or substitute), Shanghai, grain, Nov., Balfour Guthrie & Co.; Japanese stmr. Taiyu Maru, Shanghai, wheat, Oct., Mitsubishi & Co.; Japanese stmr. Usuri Maru, Japan, Nov., Suzuki & Co.

The Norwegian m.s. Loch Tay is reported fixed from the North Pacific to Melbourne with lumber, $13, Nov. loading, by Balfour Guthrie & Co., the Japanese stmr. Bankoku Maru to Sydney/Newcastle, $13.50, Oct., J. J. Moore & Co., Inc., and the sailing vessel Forest Pride to Adelaide, special business, Nov. loading $14.50.

For lumber to the Orient, the following fixtures are reported: Japanese stmr. Unkai Maru No. 12, Shanghai, Oct.; Japanese stmr. Taian Maru (ex Hanna Nielsen) 3 ports Japan, $11, Oct./Nov., Thorndyke Shipping Company; Japanese stmr. Malta Maru, Yokohama and Osaka, Nov., Yamacho Co.; Japanese stmr. Erie Maru, 3 ports Japan, Oct., Nakagawa & Co.; Japanese stmr. Kashu Maru, same, Oct., Yamacho Co.; Japanese stmr. Yayoi Maru, Yokohama and Osaka, Oct./Nov., Yamashita Co.

The American schr. Oregon Pine is reported fixed from Columbia River to Callao with lumber, Oct. loading, by W. R. Grace & Co

The following steamers are reported fixed with lumber to the Atlantic Coast: American stmr. Henry D. Whiton, $13.50, Sept./Oct.; British stmr. City of Vancouver, Oct., South Alberta Lumber Co.; Norwegian m.s. Fordefjord, Canadian Transport Co.; American stmr. Derblay, Oct., Luckenbach S. S. Line; American stmr. Daneli, same.

The Norwegian stmr. Hesperos is reported fixed from the North Pacific to South Africa, Nov. loading, by J. J. Moore & Co., Inc.

The Japanese stmr. Choyo Maru is reported fixed from Columbia River to India with ties, Oct., Pacific Export Lumber Co., and the American stmr. Samoa to Guaymas, ties, Oct., Hammond Lumber Co.

The following steamers are reported

Phoenix Insurance Co.
of Hartford, Conn.
Great American Insurance Co.
G. L. West, Manager
Pacific Marine Dept.
233 Sansome Street
Phone: Davenport 3680.
San Francisco.
BRANCH OFFICES:
Portland, Wilcox Bldg.
Seattle: Dexter Horton Building
Los Angeles: Merchants Nat'l Bank Bldg.

Marsh & McLennan
INSURANCE BROKERS
— and —
AVERAGE ADJUSTERS
114 SANSOME STREET
SAN FRANCISCO

MARINE DEPARTMENT
J. B. F. Davis & Son
Standard Marine Insurance Co.
National Union Fire Ins. Co.
Mercantile Insurance Co.
of America
240 SANSOME STREET
SAN FRANCISCO :: CALIFORNIA

Phoenix Assurance Co., Ltd.
of London
Union Marine Ins. Co., Ltd.
Norwich Union Fire Ins. Society, Ltd.
British & Federal Fire Underwriters
PACIFIC COAST BRANCH
(Marine Department)
114 SANSOME STREET
Phone Douglas 6313

fixing on time charter : British stmr. Strathfillan, British Columbia to North of Hatteras, 95 cts., delivery Japan, redelivery North of Hatteras; Danish stmr. Kina, Pacific trade, delivery Oct., Canadian Transport Co.; Norwegian stmr. Arna, one trip, British Columbia to North of Hatteras, delivery Japan, Oct./Nov., W. L. Comyn & Co.; Norwegian stmr. Horda, 5 to 7 months, $1.20, delivery and redelivery North Pacific, South Alberta Lumber Co., Oct.; Japanese stmr. Asama Maru, 7 months, Pacific trade, Yamashita Co.; Japanese stmr. Heiyei Maru No. 12, Pacific trade, 3 months, Yen 1.85, delivery Japan, Yamashita Co., Sept.; Swedish m.s. Nuolja, 9 months, Pacific trade, Yamashita Co.; Japanese stmr. Kohshun Maru, Pacific Trade, 6 months, first month Yen 1.90, balance Yen 2, delivery Japan, Suzuki & Co.; Japanese stmr. Meiwu Maru, Pacific trade, 3 months, Yen 1.80, option 6 months, Yen 1.90, delivery Japan, Yamashita Co.; Japanese stmr. Seiyo Maru, 1 year, option 2 years Pacific trade, delivery Japan, Yen 1.40, Nippon Yusen Kaisha, prompt; Norwegian stmr. Tananger, one trip, North Pacific to Australia, 4/3, J. J. Moore & Co., Inc., Oct.; Japanese stmr. Meiten Maru, 3 months, Pacific trade, delivery Japan, Yen 1.70, Yamashita Co., Oct.

The following sales are reported: American bktn. Chas. F. Crocker, W. L. Comyn & Co. to John West; American stmr. Fort Bragg, U. S. Marshal to San Francisco Iron & Metal Company, $22,000; American ship John Ena, James Botts to A. F. Mahoney; American stmr. Pansa, U. S. Shipping Board to Pacific American Fisheries, Bellingham, Wash., $100,000; American bktn. Star of Chile, Alaska Packers Association to Chas M. Cadman.

PAGE BROTHERS, Brokers.

KOLSTER RADIO COMPASSES ON COOS BAY SHIPS

KOLSTER radio compasses have just been installed by the Federal Telegraph Company on the steamship Coos Bay and the steamship F. A. Warner, operated by the Coos Bay Lmber Company.

These are the first lumber ships on the Pacific Coast to adopt this new radio aid to navigation. Many valuable hours will be saved in picking up the San Francisco Lightship in foggy weather.

The decision of the Coos Bay officials harks back to the early days of wireless telegraphy on the Pacific coast when the ships of this company were among the very first to adopt the then new aid to navigation—wireless telegraphy.

TOBIN BRONZE ABOARD SHIP

TOBIN bronze is the trade name of a special alloy manufactured for thirty years solely by the Ansonia Branch of the American Brass Company at Ansonia, Connecticut. The metal in its composition comes within the limits prescribed in various standards specifications for bronze, including those of the navy and the army. These limits are:

Copper—not less than 59 per cent nor more than 63 per cent.

Tin—not less than ½ of 1 per cent nor more than 1½ per cent.

Zinc—Remainder, with small quantities of other materials to improve quality.

The exact formula for Tobin bronze has never been published. It contains no aluminum, lead, or iron. Remarkable tensile strength (running on actual test up to 67,000 pounds with a yield point of 43,000 pounds), great toughness, and uniformity of texture and high corrosion resistance combine to produce an ideal metal for many marine uses.

The specific gravity of Tobin bronze is 8.404. It is, therefore, higher than copper; and this lightness, in combination with its great tensile strength, makes it eminently adaptable to ship use. Tobin bronze condenser plates and condenser tubes are old time favorites in the merchant marine. For many years practically all of America's yacht cup defenders have been framed and plated with Tobin bronze. It is a splendid material for the propeller shafts of motorboats, yachts, and torpedo boats, and of recent years even Pacific Coast fishing boats operating in the warm waters off Southern California are being equipped with Tobin bronze tail shafts. The elastic limit is very high and to date no report of a broken Tobin bronze shaft has been received.

Pump liners, pump pistons, pump piston rods, valve trim, valves, davits, deck bolts, ship fastenings, block pins, bolts, nuts, rivets, studs, parts of motors, and marine instruments parts form a partial list of the many uses for bronze and brass products on shipboard. Tobin bronze may be had in standard shapes and sizes to meet all requirements for these and many other applications.

The use of bronze and brass in the engine room and at other locations aboard ship is very desirable from a maintenance standpoint not only on account of resistance to corrosion, as mentioned above, but also on account of the fact that these metals are easily machined or forged and readily welded, so that parts broken or damaged may be repaired with great facility. Another important economic factor in the use of copper alloys is that they have a very much higher scrapping value than ferrous materials.

The Pacific Coast agency of the American Brass Company is in charge of A. W. Gruss, San Francisco, who has a great wealth of experience and information to place at the disposal of interested ship operators.

NEW ELECTRIC METAL MELTING POT.

A NEW metal melting pot, with a capacity of approximately 1000 pounds, has been added to the General Electric line and is now on the market. This pot, utilizing the electric heating principle, is practically the same as other standard General-Electric melting pots except that three cast-in, sheath wire immersion heating units are used instead of two.

Each heating unit is rated 5 kilowatts. The pot may be operated either on 110- or 220-volt, alternating or direct current circuits, and the use of three heating units will also permit balanced 3-phase operation.

The pot itself consists of a sheet steel, cylindrical casing in which is supported a cast iron crucible of the following dimensions: Inside, 18 inches in diameter and 15 inches in depth; outside, 29 inches in diameter and 31 inches in depth. The space between the casing and the crucible, measuring about three inches, is efficiently insulated with a compact heat insulator. The leads of the heating units are brought over the top of the pot into a connection box fixed to the unit itself.

Melting pots of this type are designed for melting lead, babbitt, tin, solder, and similar alloys or metals, except spelter or zinc, at temperatures not exceeding 850 degrees Fahrenheit.

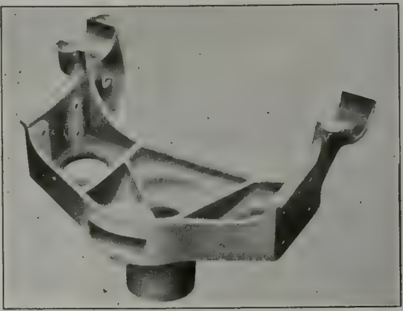
BOILER GAUGE LIGHT RESISTS VIBRATION

A BOILER gauge light, consisting of a tubular reflector with a bayonet attachment to the socket flange, has been designed and is being manufactured by the Westinghouse Electric and Manufacturing Company. A compression spring serves to maintain the connection and to hold the lamp in place, so that neither the reflector nor the lamp can loosen under vibration.

The design of the boiler gauge light permits mounting on the guard rail of any boiler water gauge or on the end of a ½-inch conduit used to carry wiring to the reflector. This mounting may be accomplished by the use of a screw driver. When it becomes necessary to change the lamp, no tools are needed to remove the reflector because one turn of the reflector disengages the bayonet attachment, and the lamp can then be screwed out of the standard socket.

The reflector is made of heavy brass tubing with a slot in one side to throw the light on the water gauge only. The reflector is easily adjustable for any desirable mounting height, and the mounting brackets are arranged to accommodate a wide range of positioning of the guard rods with relation to the gauge. Forty-eight inches of two-way conductor cord and an attachment plug are furnished regularly with the boiler gauge light. A standard tubular Mazda B lamp with T-10 bulb should be used.

The Perlit System for Casting Iron



Bracket for steering head of tractor made in Perlit iron, supplanting cast iron.

H. PLUMMER, formerly chief engineer of the Pacific Diesel Engine Company, recently made a trip to Europe for the purpose of studying various angles of the diesel engine industry. While in Europe he became very much interested in the remarkable improvement to foundry practice in gray cast iron introduced there by Heinrich Lanz, of Manheim, Germany.

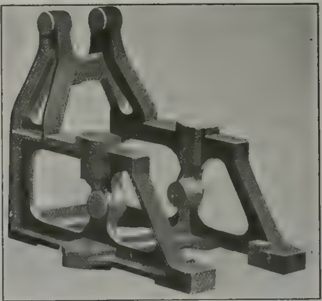
This improved process, the world-wide patents on which are controlled by Heinrich Lanz, is known as the Perlit process, and the product is known as Perlit iron. This product is an iron of almost 100 per cent pearlitic structure. The process consists of a patented system of pouring iron of low carbon, low silicon composition into molds of correct temperature and producing a tough, readily machinable, shock resisting, high duty gray cast iron which is of pearlitic structure in all of its sections and in every part of every section.

It is a well-known feature of even the best cast iron as poured by the ordinary foundry process that the structure of such iron varies greatly in sections of different thicknesses in the same casting and that test samples taken from the center of the thick sections will often show less than half the tensile strength which would be obtained from the same casting if the test bar were taken from a point close to the surface of the section. This characteristic lack of homogeneity in ordinary cast iron makes it exceedingly difficult to figure closely in designing cast iron structure, particularly with regard to tensile strains. For the same reason it frequently happens that ordinary cast iron in any complicated casting shows internal strains to a remarkable degree, often resulting in destruction of the casting. By the use of the Perlit process these objectionable features of gray cast iron are entirely eliminated. A test bar taken from any point in a properly poured Perlit iron casting will show the same tensile strength as the test bar poured from metal in the same ladle.

Perhaps the most remarkable property of Perlit cast iron is its resistance to fatigue under impact and its toughness. In tests made by A. E. McRae Smith, as recorded in the Foundry Trade Journal, July 1, 1926, tests made on two crank case covers, one of ordinary cast iron, the other of Perlit, gave the following remarkable results. The ordinary cast iron cover cracked under 242 blows of a 2-pound hammer dropped 1¼ inches. The Perlit casting took 7448 blows of the hammer. The ordinary cast iron showed a Brinell hardness of 241, while the Perlit showed Brinell 187.

In tests made on Perlit castings and test bars at Columbia University Testing Laboratories, of four pieces tested, varying in diameter from 0.478 to 0.807 inch, the average tensile strength was 40,750 pounds to the square inch. In these tests, two castings made by Heinrich Lanz in Germany were tested under hydrostatic pressure, one, a stuffing box for a compressor, was tested for the walls of the water jacket. These walls were 5 m.m., or approximately 0.2 inch, in thickness. Under a pressure of 2190 pounds per square inch a very small leak developed at a pin hole in a lug. The casting cracked under a pressure of 2940 pounds per square inch. The other specimen tested was a pipe fitting with an internal diameter of about 6 inches and a wall thickness of from 10 to 12 m.m., or 0.4 to 0.5 inch. The maximum hydrostatic pressure applied was 3000 pounds per square inch. At this pressure the casting showed no leak whatever.

It is obvious that cast iron showing these qualities has a very wide range of application in the production of high grade castings for tool and engine work and for a great variety of uses in industry and manufacture. In the production of liners for diesel engine cylinders Perlit iron is exceptionally valuable due to the fact that it shows remarkable resistance to wear and abrasion, and the rate of wear is no greater as the thickness of the metal diminishes, but is spread evenly over the life of the part. Due to the superior strength of Perlit iron, it is possible to reduce considerably the weight of machine parts made from this product. In certain machines in Germany it has been found possible to reduce the weight by as much as 28 per cent.



Special bracket for signaling gear, formerly a malleable casting, now made in Perlit iron.

The cost of producing cast iron by the Perlit process is slightly greater for any one casting. This, however, is frequently more than counterbalanced by the reduction in weight, the lower percentage of waste castings and the possibility of increased output. It is being made clear that Perlit iron is indispensible for the diesel engine industry and will have a very marked influence on the manufacture of all classes of machinery.

The Perlit process is being distributed through the method of licensing foundries to produce castings under the patents of this process. On the Continent of Europe these licenses are distributed by Heinrich Lanz. In Great Britain and in all British colonies the distribution of licenses is under the control of the British Perlit Company, Ltd. On the West Coast of the United States, the sole right to sell Perlit iron castings and licenses for the manufacture of Perlit iron under the Lanz patents has been secured by H. Plummer and on the East Coast by Dr. Theo. Zeit, Woolworth Building, New York. Following is a list of licenses in Europe:

Great Britain: The North Eastern Marine Engineering Company, Ltd.; Alfred Holt & Company; Henry Watson & Sons, Ltd.; Caledon Shipbuilding & Engineering Company, Ltd.; J. & E. Hall, Ltd.; and Vickers Ltd.

France: Societe Alsacienne de Mulhouse.

Italy: Ernesto Breda, Milan.

Czecho - Slovakia: Brunn-Konigsfelder Maschinenfabrik, Brunn.

Denmark: Burmeister & Wain.

Germany: Erhardt & Sehmea; Linke Hoffman-Lanchhammer; Heintzmann & Dreier; Ambiwerke; Marienhutte; Rheinische - Eisengieserrei; Bohn & Herber; and Dr. Werner-Werk.

The use of Perlit casting is to be considered in the following cases:

1. Parts of steam engines and diesel motors. These parts can be constructed lighter on account of the higher strength and lower internal stresses of Perlit iron.

2. Pistons, piston rings, cylinders, crossheads, gears, crosshead guides, grinding and crushing rolls, etc. The slight wear, as shown by experiments under sliding motion seems to make the use of Perlit iron in these cases advisable.

3. Perlit iron can often be used to advantage instead of cast steel. In the annealing process, which cannot be avoided, steel castings sometimes are warped. With Perlit castings no annealing is necessary.

American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

RECONDITIONING OF PRESIDENT ARTHUR

What is reported to be the largest reconditioning job undertaken on the Pacific Coast will shortly be under way at the Los Angeles Shipbuilding & Drydock Corporation, where the President Arthur is now tied up. The steamer has been purchased by the Los Angeles Steamship Company and is to be entirely reconditioned for the Hawaii tourist travel. Between five and six months will be required to do the work. The old Scotch boilers are being removed and eight Babcock & Wilcox water-tube boilers are to be installed, together with a complete oil burning system. Deep tanks for fuel oil of about 20,000 barrels capacity are to be installed. The hull and auxiliary machinery are to be thoroughly reconditioned. The upper decks are being extended and deck houses widened to provide large passenger accommodations, and all interior furnishings will be renewed.

Work of reconditioning will be supervised by Pillsbury & Curtis of San Francisco and will cost in the neighborhood of $1,300,000. Accommodations will be provided for 425 first cabin passengers and 95 third class passengers. The dining room will seat 325. All rooms will be outside, each with hot and cold running water, and 65 per cent of them will have private baths. Other accommodations for the comfort and pleasure of travellers will include a gymnasium, swimming pool, tea rooms, lounges, and sports rooms. On completion the steamer will be named the City of Honolulu.

TWO NEW FERRYBOATS FOR PUGET SOUND

This seems to be the open season for ferryboat building on the Pacific Coast.

The Sound Ferry Lines, Inc., Seattle, have asked for bids for the construction of a ferryboat, plans and specifications for which have been prepared by Lee & Brinton, Inc., naval architects of Seattle. The boat will be 176 feet over-all, 53 feet 4 inches beam, and 10 feet 6 inches draft. Certain equipment has already been ordered for the boat, including an 850-horsepower semi-diesel Sumner oil engine, a De Laval oil purifier, Cunningham electric steering gear, and Fairbanks-Morse gas engine electric generating set.

TO BUILD CRUISER

William T. Post, Tacoma, Washington, is reported to be considering the placing of an order for a 40-foot cruiser powered with a diesel engine.

OIL BARGE FOR UNION

The Union Oil Company of California, Los Angeles, have not yet awarded contract for the construction of a self-propelled oil barge on which bids were received August 2. The barge is to be 216 feet over-all, 42 feet molded beam, 13 feet loaded draft, and is to have a capacity of 12,000 barrels of oil. Propulsion machinery will consist of two 350-horsepower, single-acting, directly reversible, marine type, heavy duty diesel engines, each directly connected to a propeller shaft. The Los Angeles Shipbuilding & Drydock Corporation was low bidder for the work, having submitted a tender of $233,350 and 135 days.

FIREBOAT FOR CITY OF SEATTLE

W. C. Nickum, of Seattle, formerly vice-president of the Todd Drydock & Shipbuilding Company, Tacoma, is completing plans for the construction of a fireboat for the City of Seattle. It is reported that gasoline engines have been designated by Mr. Nickum for the power plant.

COASTWISE TANKER FOR ATLANTIC COAST

The Cities Service Transportation Company, New York, has asked for bids for the construction of a 13,000-ton steam oil tanker for coastwise service. Shipyards are requested to submit tentative plans as well as cost of construction. The tanker will be about 462 feet over-all, 68 feet beam, and 41 feet depth.

BARKENTINE TO BE CONVERTED

L. H. Coolidge, Seattle naval architect, is now preparing plans for the conversion of the four-masted steel barkentine Hawaii into a power schooner. The vessel was recently purchased by the Sterling Steamship Corporation from Hind, Rolph & Co., of San Francisco. The Hawaii is now at the Lake Union Dry Dock & Machine Works, Seattle. She will be equipped with twin 240-horsepower Fairbanks-Morse diesel engines. Some changes in her hull will be needed.

TANK BARGE FOR UNION OIL

The Union Oil Company of California, with headquarters at Los Angeles, have decided not to build at this time the self-propelled oil tank barge for which bids were received several months ago. A tow barge of 24,000 gallons capacity is now under construction at the Los Angeles Shipbuilding & Drydock Corporation.

However, it is reported that new plans and specifications are being drawn up for a small twin screw diesel powered tanker of 1600 tons deadweight and of 12,000 barrels capacity, which will be built after the first of the year.

REQUEST SISTER SHIP FOR LEVIATHAN

Chairman T. V. O'Connor of the Shipping Board said orally on October 1st that he will advocate the construction or purchase of a sister ship to the Leviathan, as a step toward the full

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coordination of the services now performed by the Shipping Board lines.

Mr. O'Connor stated, upon his return from his trip to Europe, that in case of the failure of the plan for a sale of the Leviathan and other ships of the United States Lines to private American interests he would advocate the appropriation of sufficient funds by Congress to allow the addition of a ship of the Leviathan class to the Shipping Board fleet.

DREDGE FOR MEXICO

The Chamber of Commerce of Mexico is making inquiries in New York and elsewhere for a dredge for the Division of Ports of the Department of Communication and Public Works of the Mexican government. The Mexican government has authorized extensive improvements in several ports, one of which is Mazatlan on the West Coast requiring extensive dredging.

Power Tests on U.S.S. Saratoga

The steamship Saratoga, one of the world's two largest and most powerful airplane carriers, built for the United States Government by the American Brown-Boveri Electric Corporation, Camden, New Jersey, was successfully moved to a new berth in the Newton Creek outfitting basin on September 4. Since her launching in April of last year, this giant vessel has been moored in the "wet slip" adjoining the launching ways. On Monday, September 6, she was brought back to the "wet slip" for dock trials. This undertaking, to those who have been following the construction of one of America's largest naval vessel, marked the approach of another phase in the complex task.

The next step was the testing of the largest power plant ever installed in any steamship. Twelve big tugs were necessary to tow the vessel out of the slip and down the Delaware River about a mile. Owing to the immense size of the Saratoga and her tremendous driving power, special arrangements were required for the dock tests. A large lattice-work crib was built on the bulkhead of the wet slip sufficiently strong to hold the vessel in position during the test and to withstand the enormous thrust of the ship when her propellers were in motion. With only one propeller running at half the maximum speed, the pressure of the bow of the ship against the bulkhead crib was 400,000 pounds.

Largest Diesel-Electric Tugs for Panama Canal

Evidence of the growing sentiment in favor of diesel-electric ship propulsion is found in the fact that the Panama Canal Commission will add to its present fleet of steam engine driven tugs two tugboats propelled by the diesel-electric type of drive. In addition to being the first of this type for operation in the Panama Canal, these will be the largest and most powerful diesel-electric tugs in the world.

One tug will operate under the supervision of the marine division of the canal on the Pacific Coast, towing large vessels into and out of the entrance of the canal, and the other will be operated by the dredging division for dredging operations in various parts of the canal. Each boat will have an overall length of 150 feet.

The power plant of each tug will consist of two 6-cylinder, 480-horsepower diesel engines to be build by the Ingersoll-Rand Company, each direct-connected to a 330-kilowatt, 257-r.p.m. main generator and a direct-connected auxiliary generator of 50 kilowatts rating. The auxiliary generator will supply power for running auxiliaries, lighting the boat, etc., and will also act as an exciter for the main generator and the propulsion motor. All the electrical equipment on the boats will be furnished by the General Electric Company.

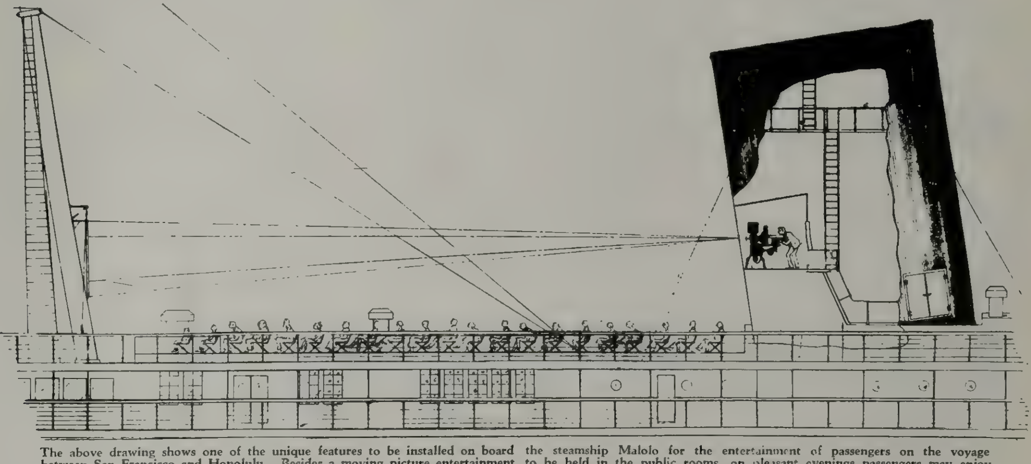
The propulsion motor will be a 750-horsepower single-armature 150-r.p.m., shunt-wound, direct-current motor governed by the variable-voltage method and controlled from the pilot house. Among the electrically operated auxiliaries will be a hydro-electric steering gear, an air compressor and a single-stage centrifugal fire pump. There will also be a motor-driven fuel oil transfer pump and two other motor-driven rotary pumps having a capacity of 250 gallons per minute each.

CURRENT AMERICAN SHIPBUILDING

On September 1, 1926, American shipyards were building or under contract to build for private shipowners 215 steel vessels of 263,094 gross tons compared with 209 steel vessels of 246,150 gross tons on August 1, 1926, according to the Bureau of Navigation, Department of Commerce.

There were 26 wood vessels of 12,148 gross tons building or under contract to build for private shipowners during the same period compared with 18 wood vessels of 8,205 gross tons on August 1, 1926.

Two 8½-ton Brunswick-Kroeschell steam driven refrigerator units, adding approximately 7000 cubic feet of space, have been installed in the vessels Maunalei and Maunaweli, of the Matson Navigation Company at San Francisco. The installation work was done by the General Engineering & Dry Dock Company. Berry E. Dunn & Company represent the Brunswick-Kroeschell Company, at San Francisco.



The above drawing shows one of the unique features to be installed on board the steamship Malolo for the entertainment of passengers on the voyage between San Francisco and Honolulu. Besides a moving picture entertainment to be held in the public rooms, on pleasant evenings passengers may enjoy their favorite film actors and actresses under the stars.

In Pacific Coast *Shipyards*

Ship Repairing ~ Ship Building ~ Reconditioning ~ Engine Repairs

Recent Shipbuilding Contracts

Bethlehem Shipbuilding Corp., Ltd., Union Plant, San Francisco, has a contract for three diesel-electric double-end vehicular ferryboats of steel construction for the Southern Pacific Company, San Francisco. The boats will be 256 L.O.A., 44 feet 10 inches beam, 11 feet depth, and of 1600 tons displacement. They will have four 450-horsepower Nelseco Type 6 MI-22 diesel engines connected to General Electric generators of 275 kilowatts, 250 volt marine type. Each propeller is to be driven by a 1250-horsepower double armature 1000 volt General Electric motor.

The Moore Dry Dock Company, Oakland, California, has received an order from the Southern Pacific Company for two diesel-electric vehicular ferryboats the same as those mentioned above to be built by Bethlehem. These boats are for the Northwestern Pacific ferry service and will have Nelseco engines and Westinghouse generators and Motors.

General Engineering & Drydock Company, San Francisco and Alameda, have two important ferryboat contracts. One is for one ferryboat for the Northwestern Pacific Railroad to be the same as the other five ordered by the Southern Pacific Company from Bethlehem and Moore Dry Dock Company.

The other order is for three double-end, screw propeller, diesel-electric ferryboats of wooden construction for the Golden Gate Ferry Company. These boats will be 240 feet over-all, 44 feet molded beam, and 17 feet molded depth. The power plant in each boat is to consist of three Ingersoll-Rand 400-horsepower diesel engines, each connected to Westinghouse generator. Each propeller is to be operated by a 950 shaft horsepower, single armature, marine type Westinghouse motor.

Skanzie Shipbuilding Company, Tacoma, Washington, have an order from the Pierce County Transportation Company for a ferryboat 165 feet over-all, 51 feet beam, to be powered with a 360-horsepower fully reversible Fairbanks-Morse diesel engine. The ferryboat will be double-ended type and will have capacity for 60 automobiles. Mitchell B. Skanzie is president of both the ferry company and the shipyard which is doing the building.

Sun Shipbuilding & Drydock Company, Chester, Pa., has a contract for the construction of a twin screw diesel-propelled bulk oil barge from the Tidewater Oil Company, 11 Broadway, New York. The vessel will be 258 ft. 8 in. L. B. P., 260 feet 10 inches over-all, 40 feet wide, and a capacity of 10,000 barrels of oil. The propelling power will be Winton diesel engines. The cost of the boat will be $393,000. R. H. Jones is marine manager of the company.

This company has also received an order from the Gulf Refining Company for two shallow draft gasoline delivery barges for the Gulf service of the Gulf Refining Company. The boats will be 142 feet over-all, 27 feet beam, and 9 feet draft, and will be powered with two Kahlenberg direct drive oil engines of 200 brake horsepower each, connected to twin screws. Kindlund & Drake, 17 Battery Place, New York, are the architects.

John W. Sullivan & Son, New York City, have contract from the New York City Department of Plant and Structure for an 89-foot fuel oil barge.

Dravo Contracting Company, Pittsburgh, Pa., have an order for four steel hopper type barges for Pittsburgh Plate Glass Company, 135 by 26 by 10 feet, 320 gross tons each.

American Bridge Company, Pittsburgh, Pa., has an order for six barges for the United States Engineers, St. Louis, 152 by 34 by 7 feet. This company also has an order for five barges for the Wheeling Steel Co., 140 by 26 by 10 feet, and 15 barges for the Carnegie Steel Company to be 175 by 26 by 11 feet.

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In Atlantic Coast *Shipyards*

Ship Repairing — Ship Building — Reconditioning — Engine Repairing

The Midland Shipbuilding Company, Midland, Ontaria, has an order from the Canada Steamships, Limited, for two package freighters to be 230 feet over-all, 38 feet beam, and 23 feet depth. Keel will be laid October 11.

American Brown Boveri Electric Corp., Camden, N.J., has an order for four barges for the Reading Company to be 110 by 32 by 9½ feet. This company has also order for two barges for the Venezuela Gulf Oil Company to be 80 by 24 by 6 feet. Keels for all barges are to be laid this fall.

Howard Shipyards & Dock Company, Jeffersonville, Indiana, have an order from E. T. Slider, New Albany, Indiana, for four steel guide docks, to be 120 by 24 by 4 feet. This company also has an order for a hull from the Baton Rouge Car Terminal; also an order from D. T. Williams, Richmond, Kentucky, for a steel automobile ferryboat to be 93 by 20 by 2 feet 6 inches.

Midland Barge Company, Midland, Pa., has an order for two steel sand and gravel dredge hulls for E. T. Slider, New Albany, Ind., to be 175 by 50 by 6 feet.

Staten Island Shipbuilding Company has an order for two wood caissons for the Mid-Hudson Bridge and one caisson for Howland Hook.

Lake Washington Shipyards, Houghton, Wash., has an order for a diesel-engined cruiser for Stewart Edward White to be 58 feet long and have 55 horsepower Washington Estep diesel engine. Keel was laid October 11. This yard also has an order for five scows.

KEEL LAYINGS

Seven steel motor patrol boats for United States Coast Guard, Washington, by American Brown Boveri Electric Corp. during September.

Grain elevator for International Elevating Co., by Staten Island Shipbuilding Co., Sept. 30.

One oil barge for Proctor & Gamble by Sun Shipbuilding Co., Chester, Pa., Oct. 4.

W. A. Shepard, towboat for W. C. Kelly Barge Line by The Chas. Ward Engineering Works, Sept. 23.

Steel single screw day steamer for Hudson River Day Line, New York, by The Pusey & Jones Co., Wilmington, Del., Sept. 15.

Cruiser for Stewart Edward White by Lake Washington Shipyards, Houghton, Wash., Oct. 11.

LAUNCHINGS

Peralta, steel double-end screw ferryboat for Key System Transit Co., San Francisco., by The Moore Dry Dock Company, Oakland, Oct. 14.

Alpine Fir, motorboat for British Columbia Forestry Dept., by Prince Rupert Drydock and Shipyards, Prince Rupert, B. C., Oct. 9.

Carfloat for Southern Railway Co., by Bethlehem Shipbuilding Corp., Sept. 30.

Steel carfloat for Pennsylvania Railroad by Wm. Cramp & Sons Ship & Engine Building Co., Sept. 11.

Algonquin, passenger and freight steamship for Clyde Steamship Co., by Newport News Shipbuilding & Drydock Company, Sept. 9.

American Legion, ferryboat for City of New York by Staten Island Shipbuilding Co., Sept. 29.

DELIVERIES

Associates, diesel tank barge for Associated Oil Co., by Bethlehem Shipbuilding Corp., Oct. 14.

Charles C. Donoghue, ferryboat for City of Boston, by Bethlehem Shipbuilding Corp., Fore River Plant, Sept. 23.

Carfloat for Long Island Railroad Co., by Bethlehem Shipbuilding Corp., Aug. 25.

Glenmohr, single deck freighter for Great Lakes Transportation Co., Ltd. by Midland Shipbuilding Co., Ltd., Aug. 14.

Raymond, diesel-electric pipe line dredge for U. S. Engineers, Philadelphia, by Newport News Shipbuilding & Drydock Co., Sept. 8.

Barge for Sun Oil Co. by Sun Shipbuilding Co., Oct. 9.

Sumar, twin-screw diesel motor yacht for David C. Whitney by Todd Engineering, Drydock & Repair Corp., Aug. 30.

REPAIR AWARDS

Yarrows, Ltd., Esquimalt, B. C., has the contract for repairs on the Swedish motorship Buenos Aires, which grounded on Pender Island near Vancouver recently. The vessel is berthed at the old Esquimalt dry-dock. The bow is badly damaged.

Low bid for the conditioning of the Shipping Board steamer Eastern Mariner for spot service was submitted by Robert McIntosh of Portland. The vessel is in the Columbia River. Robert McIntosh submitted a bid of $34,672; Albina Marine Iron Works, $37,660; Albina Engine & Machine Works, $38,475; Central Engineering Works, $39,642; Helser Machine Works, $39,885; Commercial Iron Works, $41,000; Smith & Watson Iron Works, $43,000; and Willamette Iron & Steel Works, $46,980. As the vessel has been laid up since 1921, considerable additional work and much equipment would be needed to properly refit her for service.

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The Sumner K. Prescott Company
Prescott Tractors
Robt. H. Laverie, Inc.
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Bridgeport Brass Company Condenser Tubes

Todd Dry Docks, Inc., Harbor Island, Seattle, has been awarded contract for repairing broken lower section of the stern frame of the Shipping Board steamer West Himrod on a bid of $21,600.

MISCELLANEOUS

The Board of State Harbor Commissioners, Ferry Building, San Francisco, has rejected all of the recently opened bids for the construction of Pier 45, San Francisco, and will receive new bids on October 15. Chief Engineer Frank G. White declared the first bids too high.

Yarrows, Ltd., Victoria, B. C., has been awarded the contract to repair the Imperial Oil Company's tanker Imperial, which was damaged when she went aground in Gunboat Pass recently. The vessel's hull was pierced in two places and many of her plates dented.

The firm of Babcock & Thearle, of Tacoma, Washington, was recently incorporated as the Babcock & Thearle Shipbuilding Company, with an authorized capital stock of $30,000. Babcock and Thearle have been building small workboats and tugs for the past two

Artist's drawing of a fine yacht recently designed by Cox & Stevens, naval architects of New York, for one of their clients.

years, but now plan to construct almost exclusively small speedboats of the cruiser class.

Westinghouse Electric & Manufacturing Company has received the award of contract from the Navy Department for electrical motor and other electrical equipment for the new submarines V-5 and V-6 which are now under construction at the New York Navy Yard and Mare Island Navy Yard. The Westinghouse bid for electrical motors and equipment was $294,775.

The Board of State Harbor Commissioners, San Francisco, have under consideration the enlargement of the grain terminal and the creating of a terminal for assembling, distributing, and shipping canned and dried fruits and vegetables. Mr. Sherman, President of the Board, suggested the new China Basin Terminal for the canned and dried goods terminal.

The American Dredging Company was low bidder for the dredging of Brooklyn Basin on the Oakland Waterfront, when the War Department Engineers at Washington opened bids recently. Approximately 518,000 cubic yards of material will be removed from the basin and dumped on Government Island. A channel 300 feet wide and 20 feet deep will be dredged. The bid of the American Dredging Co. was 24.74 cents per cubic yard. The Antioch Dredging Company bid 25 cents a cubic yard.

The steamship Oaxaca was recently equipped with new radio apparatus at the Union Iron Works of the Bethlehem Shipbuilding Corporation.

A Kolster interrupted D. C. synchronized rotary gap transmitter of ¾ kilowatt power, manufactured by the Federal Telegraph Company is being installed, owing to its signal adaptability to small vessels, no intermediary motor generator between the ship power mains and the radio set being required.

The transmitter will cover all standard wave lengths between 600 meters and 950 meters. The receiver will have a wave length range extending from 300 to 18,000 meters.

Recent Port Construction Contracts

San Francisco. The Board of State Harbor Commissioners has awarded the contract for the construction of the new Pier 45, to Healy, Tibbits Company, San Francisco, on a bid of $1,090,842. The pier will be at the north end of the present system of docks and will be 1315 feet long and 358 feet wide.

Another important port development is the progress being made toward the fulfillment of the plans which have been long in course of development for the establishment of a shipping and industrial terminal on Mission Rock, San Francisco. The Mission Rock Company, of which Harry S. Scott is one of the leaders, was formed some time ago. An agreement between this company and the Board of State Harbor Commissioners is now being drawn up. Mission Rock is located opposite Pier 50 at the southern end of the present San Francisco pier system. Pier 50 is built out directly opposite Mission Rock property and to within 63 feet of its line, so that connection with the shore can be made easily available. It is the intention of the company to build manufacturing lofts and warehouse buildings, which will be a very advantageous feature for manufacturers, who will thereby have the deep-water docks right at their doors.

Port San Francisco. Ground was broken on October 10 at the new project for the development of Port San Francisco south of San Francisco on the Belmont waterfront. The plans for this project cover dredging, filling, and dock building to provide fourteen miles of deep water wharfage, two large turning basins and fourteen slips with 30-foot depth. The organization is known as the San Francisco Bay Terminals, with offices in San Francisco.

Oakland. The City Council will shortly ask for bids for the construction of the new Grove Street pier, which is to be 550 feet long and 500 feet wide and will cost in the neighborhood of $1,500,000. It will provide 1700 feet of berthage space and 168,000 square feet of transit shed. The pier will have a solid fill type of substructure, work on which has already been started. Public Works Engineer Leroy Goodrich approved plans on October 13.

Long Beach. Bids were opened by Major H. A. Finch of the Army Engineers and forwarded to Washington on September 29 for the deepening of the main channel of Long Beach Harbor. Bids were submitted by the United Dredging Company, the San Francisco Bridge Company, Fred Franks Dredging Company, Merritt, Chapman & Scott, and the Western Dredging Company. The work will consist of removal of 1,000,000 cubic yards on the channel and of 350,000 in the slip penetrating the lease which the Ford Motor Company has obtained on the Union Pacific property.

Tillamook Bay, Oregon. The Tacoma Dredging Company, Tacoma, Washington, has been awarded a contract by the United States Army Engineers, Second Portland District, for dredging Tillamook Bay. About 647,000 cubic yards of material is to be removed at a cost of 20.25 cents a yard.

Mexico. Important construction work is about to be undertaken by the Mexican government at the Port of Mazatlan on the west coast of Mexico. An appropriation of 7,000,000 pesos ($700,000) have been made by the government to cover the construction of a stone breakwater 700 meters in length, the dredging of the inner harbor, and the construction of a 300-foot steel concrete pier.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works

Purchasing Agent: O. W. Streett.

Associates, hull 5330, diesel tank barge for Associated Oil Company; 160 L.B.P.; 38 breadth; 9'6" molded depth; 7' molded draft; 4000 bbls. oil capacity; Union diesel engs.; keel June 15/26; launched Oct. 2/26; **delivered Oct. 14/26.**

Not named, hull 5331, double-end diesel-electric vehicular ferryboat for Southern Pacific Co., San Francisco; 256' L.O.A.; 44'10" beam; 19' depth; four Nelseco diesel engines, 450 H.P. each; keel Nov. 1/26 est.

Not named, hull 5332, sister to above.

Not named, hull 5333, sister to above.

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

Reed No. 3, hull 83, scow for Reed Mill Co., Shelton Wn ; 95'x33'x8'5".

Reed No. 4, same as above.

Reed No. 5, same as above.

LAKE WASHINGTON SHIPYARDS.

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Cruiser for Stewart Edward White, 58 feet L.B.P.; 55 H.P. Washington-Estep diesel eng.; **keel Oct. 11/26.**

Five scows, 60 ft. long **keels Oct. 11/26.**

THE MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

Peralta, hull 170, double-ended, screw propelled ferryboat for Key System Transit Co.; 256 L.B.P.; 47 molded beam; 21 molded depth; 14.5 normal speed; turbo-electric propulsion; water-tube boilers; keel May 3/26; **launched Oct. 14/26;** deliver Dec. 1/26 est.

Buena Vista, hull 171, sister to above; keel May 3/26; launch Oct. 15/26 est.; deliver Dec. 15/26 est.

PRINCE RUPERT DRYDOCK AND SHIPYARDS

Prince Rupert, B.C.

Alpine Fir, hull 10, motorboat for British Columbia Forestry Dept., 40′ long, 16 H.P. Vivian eng.; keel July 26/26; **launched Oct. 9/26.**

W. F. STONE & SON

Oakland, Calif.

Purchasing Agent: Lester Stone.

No name, motor cruiser, for stock, 36x10x3½ ft.; 12 mi. speed; 65-HP. gas engines.

Not named, hull 823, passenger boat for Capt. Fred Lewis; 50 L.B.P.; 14 beam; 3′ 6″ loaded draft; 10 mi. speed; 50 I.H.P. gas eng.; deliver Oct. 1/26 est.

Not named, hull 824, yacht for John Borden; 140 L.B.P.; 30 beam; 14 loaded draft; 10 mi. speed; 360 I.H.P. diesel engs.; keel Sept. 1/26 est.; deliver May 1/27 est.

Not named, hull 828, yacht for Frank B. Drake; 55 L.B.P.; 13 beam; 6 loaded draft; 7 mi. speed; 30 I.H.P. gas eng.; keel Aug. 25/26 deliver May 1/27 est.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY

Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 149′ 2″ x 33′ 4″x5′ 10-5/16″.

Two towboat hulls for Carnegie Steel Corp., Pittsburgh; 170′x38′10″x6′ 1¾; 1 delivered July 29/26.

Ten steel coal barges for Hillman Trans. Co., 175x26x11 ft.

Six barges covered for Carnegie Steel Co., 175x26x11 ft.

Five coal barges for Wheeling Steel Corp.; 140′x26′x10′; deliver Nov./26 est.

Six barges for U. S. Engineers, St. Louis, 152x34x7 ft.

Five barges for Wheeling Steel Corp., 140x26x10 ft.

Fifteen barges for Carnegie Steel Co., 175x26x11 ft.

AMERICAN BROWN-BOVERI ELECTRIC CORP.

Camden, N. J.

Purchasing Agent: L. G. Buckwalter.

Hull 319, steel motor patrol boat for U.S. Coast Guard, Washington, D.C.; 125 L.O.A.; 23′6″ molded beam: 220 tons displacement; Winton diesel engs.; keel July/26.

Hull 320; same as above; keel July/26.

Hull 321, same as above; keel July/26.

Hull 322, same as above; keel July/26.

Hull 323, same as above; keel July/26.

Hull 324, same as above; keel July/26.

Hull 325, same as above; **keel Sept./26.**

Hull 326, same as above; **keel Sept./26.**

Hull 327, same as above; **keel Sept./26.**

Hull 328, same as above; **keel Sept./26.**

Hull 329, same as above; **keel Sept./26.**

Hull 330, same as above; **keel Sept./26.**

Hull 331, same as above; **keel Sept./26.**

Hull 332, same as above.

Hull 333, same as above.

Hull 334, same as above.

Hull 335, same as above.

Hull 336, same as above.

Hull 337, same as above.

Hull 338, same as above.

Hull 339, same as above.

Hull 340, same as above.

Hull 341, same as above.

Hull 342, same as above.

Hull 343, same as above.

Hull 344, same as above.

Hull 345, same as above.

Hull 346, same as above.

Hull 347, same as above.

Hull 348, same as above.

Hull 349, same as above.

Hull 350, same as above.

Hull 351, same as above.

Hull 352, diesel-electric vehicular ferryboat for Electric Ferries, Inc., New York; 155 L.O.A.; 48′6″ beam; 14′3″ depth; keel June/26; launch early fall 1926.

Hull 353, same as above; keel June/26; launch early fall 1926.

Hull 354, same as above; keel June/26; launch early fall 1926.

Hull 355, same as above; keel June/26; launch fall 1926.

Hull 356, same as above; keel June /26; launch fall 1926.

Hull 357, same as above; keel June /26; launch fall 1926.

Hull 358, barge for Reading Co., 110x32x9.5 ft.; keel fall /26 est.

Hull 359, same as above; keel fall /26 est.

Hull 360, same as above; keel fall /26 est.

Hull 361, same as above; keel fall /26 est.

Hull 362, barge for Venezuela Gulf Oil Co., 80x24x6 ft.; keel fall /26 est.

Hull 363, same as above; keel fall /26 est.

THE AMERICAN SHIP BUILDING COMPANY

Cleveland, Ohio.

Purchasing Agent: C. H. Hirsching.

No name, hull 793, bulk freighter for Pickands, Mather & Co.; 580 L.B.P.; 60 beam; 20 loaded draft; 13 mi. loaded speed; 12,000 D.W.T.; T.E. engs.; 2400 I.H.P.; 3 B. & W. boilers 200 lbs. pressure; keel July 19, 1926.

No name, hull 794, sister to above; keel Aug. 9/26.

No name, hull 795, bulk freighter for Inland Steel Co.; 596 L.B.P.; 64 beam; 20 loaded draft; 13 mi. speed; 13,500 D.W.T.; T.E. engs.; 2700 I.H.P.; 3 Scotch boilers, 14′6″x11′x185 lbs.

No name, hull 796, bulk freight steamer for Kinsman Transit; 580 feet L.B.P.; 60 feet beam; 20 loaded draft; 13 mi. speed; 12,000 D.W.T.; triple expansion engs.; 2500 I.H.P.; 3 Scotch boilers, 14x11; 195 lbs. pressure.

No name, hull 797, self-unloading bulk freighter for Bradley Transportation Co.; 615 L.B.P.; 65 beam; 20 loaded draft; 14 mi. speed; 13,000 D.W.T.; turbo-electric drive; 4000 I.H.P.; 2 water tube boilers; 380 lbs. pressure.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT

Quincy, Mass.

Lexington, hull 1300, airplane-carrier U.S.N., launched Oct. 3/25.

Charles C. Donoghue, hull 1398, ferryboat for City of Boston, 172 L.B.P.; 40-8 beam; 10-4½ draft; 2 Comp. engs. 860 I.H.P.; 2 Scotch boilers; 10′ dia. 13′ long; keel Apr. 13/26; launched Sept. 11/26; **delivered Sept. 23/26.**

Daniel A. McCormack, hull 1399, sister to above; keel Apr. 13/26.

Hull 1401, ferryboat for Jamestown & Newport Ferryboat Co.; 126 L.B.P.; 48 beam; 14 depth; 700 gro. tons.

Hull 1402, carfloat, N.Y., N.H. & Hartford R.R.; 360′x40′x11′6″; 1375 gro. tons; keel July 14/26.

Hull 1403, carfloat, same as above; keel July 15/26.

Hull 1404, carfloat, same as above.

Hull 1405, carfloat, same as above.

BETHLEHEM SHIPBUILDING CORP., HARLAN PLANT

Wilmington, Del.

No. 20, hull 3505, carfloat for Long Island R.R. Co.; 290 L.B.P.; 42 beams; 11′ 6″ loaded draft; 1200 gross tons; keel Apr. 15/26; **launched Aug. 13/26; delivered Aug. 25/26.**

No. 21, hull 3506, carfloat same as above; keel May 1/26.

Hull 3507, barge for U.S. Engineers, Savannah, Ga., 60 L.B.P., 22 beam; 4 loaded draft; 44 gross tons; keel June 21/26; launched July 21/26.

Hull 3508, barge same as above; keel Aug. 9/26.

Hull 3509, barge same as above; keel Aug. 9/26.

Hull 3510, carfloat, So. Ry. Co.; 195′x33′x9′; 480 gro. tons; keel Aug. 23/26.

Not named, hull 3511, oil barge for Seaboard Shipping Corp.; 170′x37′x12′6″.

BETHLEHEM SHIPBUILDING CORP., BALTIMORE DRY DOCK

Baltimore, Md.

Hull 6134, carfloat for So. Ry. Co., 145′x33′x10′; 492 gro. tons; keel Sept. 8/26; **launched Sept. 30/26.**

Hull 6135, carfloat for Western Maryland R. R., 190′x35′x9′; 400 gr. tons; keel May 20/26; launched Sept. 7/26.

Hull 6136, carfloat for Western Maryland R. R.

CHARLESTON DRY DOCK AND MACHINERY COMPANY

Charleston, S. C.

Purchasing Agent: Charles R. Valk.

Lighter, 100′x30′x8′; launched Aug. 19/26.

Lighter, 80′x26′x7; keel Aug. 6/26; **launched Oct. 4/26.**

CONSOLIDATED SHIPBUILDING CORPORATION

Morris Heights, N. Y.

Evening Star, hull 2842, cruiser, H. H. Demmert; 71′x13′; 2 MR-6-180 H.P. Speedway engs.

Avalanche III., hull 2843, cruiser, Anson Hard; 100′x16′; 2-300 H.P. Speedway engs.

Carminita II., hull 2844, cruiser, G. E. Halliday; 60′x13′; 1-115 H.P. Speedway eng.

Marinette II., hull 2846, cruiser, E C. Romph; 74′x15′; 2-300 H.P. Speedway eng.

Kegonsa, hull 2847, cruiser, G. Dahl; 81′x14′; 2-500 H.P. Wright Typhoon engs.

Hull 2859, cruiser, Dr. J. A. Vietor; 82′x14′6″; 2-300 H.P. Speedway engs.

WILLIAM CRAMP & SONS SHIP & ENGINE BUILDING CO.

Philadelphia, Pa.

Purchasing Agent: Ed. C. Geehr.

Malolo, hull 509, express psgr and frt liner, Matson Navigation Co.; 582 LOA; 577 length at water line; 83 ft beam; depth molded to C deck 54 ft.; displacement 22,050 tons; 8250 DWT; speed 22 knots regular, 23 knots maximum; 25,000 shaft horsepower; Cramp-Parsons turbines; oil burning B & W water-tube boilers; keel May 4/25; launched June 26/26; deliver May 1/27 est.

Yarmouth, hull 518, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55-6 beam; 29-6 molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears, six single-ended Scotch boilers keel Feb. 23/26; launch Oct. 30/26 est.

Evangeline, hull 524, twin screw passenger and freight steamer for Eastern Steamship Lines; 378 length at water line; 55′6″ beam; 29′6″ molded depth to upper deck; 5890 tons displacement; 1040 D.W.T.; 18 knots; 7500 S.H.P.; two Parsons turbines with reduction gears; 6 single-ended Scotch boilers; keel May 1/26; launch Dec. 1/26 est.

Hull 527, steel carfloat for Pennsylvania R.R.; 250′ molded length; 34′ molded breadth; 9′ molded depth; keel June 4/26; **launched Sept. 11/26.**

Hull 528, same as above; keel June 28/26; launch Nov./26 est.

Hull 529, same as above; keel July 28/26; launch Nov./26 est.

Hull 530, same as above; keel Aug. 17/26; launch Nov./26 est.

Salt Lake City, hull 531, light cruiser for United States Navy; 10,000 tons displacement; keel Apr./27 est.

DRAVO CONTRACTING COMPANY

Pittsburgh, Pa.

Wakerobin, hull 453, lighthouse tender for Bureau of Lighthouses, 153-6 long, 43 beam; 6-6 depth; 900 gro. tons.

Hulls 494-502 inc., 9 steel barges for stock; 230x45x11 ft.; 650. gro tons ea.

Hulls 434-438 inc. and 503; 6 steel barges for Keystone Sand & Supply Co.; 135′ x 27′ x 6′; 320 gro. tons ea.

Hulls 511-530 inc. 20 steel barges for U.S. Engineers, St. Louis, Mo.; 55′x16′x3′; 26 gro. tons each.

Hull 531, 1 diesel engine towboat, Wheeling Steel Corp., Wheeling, W. Va.; 110′x26′x5′; 215 gro. tons.

Hulls 532 and 533, two steel barges, for stock, 55x16x3ft.

Hull 534, 1 ladder type sand and gravel dredge for Pittsburgh Plate Glass Co.; 155x44x8ft., 430 gross tons.

Hulls 535-538 inc., four steel whirler boat hulls for Contracting Dept.; 40x48x5′6″; 100 gro. tons.

Hull 539, 1 diesel engined towboat for Labelle Transportation Co., 110′x26′x5′; 215 gro. tons.

Hulls 544-550 inc., 7 pile driver hulls for U.S. Engineers, St. Louis; 88′x25′x4′; 100 gro. tons ea.

Hulls 540-543 inc.; 4 steel barges for Keystone Sand & Supply Co.; 135′x27′x8′; 320 gro. tons ea.

Hulls 551-552, two pile driver hulls for Fruin-Colnon Contracting Co., St. Louis; 88′x25′x4′; 100 gro. tons ea.

Hull 553-566 inc., 14 steel barges for Mississippi River Commission, Memphis; 120′x30′x7′4″; 430 gro. tons ea

Hulls 540 to 543 inc., 4 steel barges for Keystone Sand & Supply Co., 135x27x8 ft.; 320 gro. tons each.

Hulls 569-572 inc., 4 steel hopper type barges for Pittsburgh Plate Glass Co., 135x26x10 ft. 320 gro. tons ea.

DUBUQUE BOAT & BOILER WORKS

Dubuque, Iowa

Purchasing Agent: A. L. Yehger.

Two steel dump scows for U.S. Engineers, Louisville, Ky.

Thorpe, river towboat for Upper Mississippi Barge Line Co. & Inland Waterways Corp.; 132′x35′x3′6″; stern wheel, tandem comp. surface condensing engs.; 15″x30″x78″ stroke; keel Oct. 1/26 est.; launch Mar. 1/27 est.; deliver Apr. 1/27 est.

Weber, river towboat, sister to above; keel Oct. 1/26 est.; launch Mar. 1/27 est.; deliver Apr. 1/27 est.

Morse, river towboat, sister to above; keel Oct. 1/26 est; launch Mar. 1/27 est; deliver Apr. 1/27 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY

Kearny, N. J.

Purchasing Agent: R. S. Page.

Willets Point, hull 85, seagoing, diesel-electric hopper dredge for U. S. Army Engineers; 193 ft LBP; 41 beam; 19 ft 6 in depth molded; two Winton diesel engines; keel Dec. 16/25; launched June 26/26; deliver Sept. 10/26 est.

Gulfpride, hull 86, tanker for Gulf Refining Co.; 525' L.B.P.; 74' beam; 28' loaded draft; 11 **knots** speed, 17,400 D.W.T.; 4500 I.H.P. diesel engs.; keel June 15/26, launched June 15/26.

No name, hull 89, passenger and freight steamer for Southern Pacific Steamship Lines, Pier 49, North River, New York, 427 L.B.P.; 60 beam; 25'6" loaded draft; 6700 D.W.T.; De Laval steam turbines; 7700 S.H.P.; 4 B. & W. boilers, 21,900 sq. ft. heating surface; 16,000 sq. ft. superheating surface.

HOWARD SHIPYARDS & DOCK COMPANY

Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

No name, hull 1590, diesel-electric side-wheel excursion boat for stock; 250x40x7 ft.; 15 mi. speed; 2400 HP diesel engs.

Patricia Barrett, hull 1592, steam towboat for Barrett Line, Cincinnati; 125' L.B.P.; 40' beam; 6' deep; 4' loaded draft: comp. engs. 18"x32"x6': 4 Scotch boilers, 44"x22'; keel June 23/26; **launched Sept. 21/26**; deliver Nov. 15/26 est.

Hull 1593, **steel hull for stmr.** Mississippi of Mississippi River Com., St. Louis, Mo.; **keel Sept. 25/26.**

Hull 1596, concrete mixer hull for Mississippi River Commission, St. Louis, Mo.; 120 L.B.P.; 45 beam 7' depth; keel Oct. 1/26 est.

Hull 1597, steel guide dock for E. T. Slider, New Albany, Ind.; 120'x24'x4'.

Hull 1598, same as above.

Hull 1599, same as above.

Hull 1600, same as above.

Hull 1601, hull for Baton Rouge Car Terminal, Baton Rouge, La.; 285'x60'x9'6".

Hull 1602, steel automobile ferryboat for D. T. Williams, Richmond, Ky.; 93'x20'x2'6".

MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wis.

Purchasing Agent: H. Meyer.

Hull 226, one car ferry for Grand Trunk Milwaukee Car Ferry Co.; 360' L.O.A.; 58' molded beam, 21'6" depth; 2 T.E. engs.; 4 Scotch boilers.

Hull 227, car ferry, sister to above.

MIDLAND BARGE COMPANY

Midland, Pa.

Purchasing Agent: H. S. Neal.

One tunnel boat for General Development Co.; 82' long; launch Oct. 15/26 est.

One hull for Dillman Egg Case Co., 70x30x40 ft.; **launched Oct. 4/26.**

One barge for Southern Cotton Oil Co., 100x35x7 ft.; keel Oct. 15/26 est.

Fifteen barges for Inland Waterways Corporation, 126'x33'x7'6"; 1 keel laid Oct. 6/26.

Steel sand and gravel dredge hull for E. T. Slider, New Albany, Ind., 175'x50'x6".

MIDLAND SHIPBUILDING COMPANY, LTD.

Midland, Ontario

Purchasing Agent: R. S. McLaughlin.

Glenmohr, hull 16, single deck freighter for Great Lakes Transportation Co., Ltd., Midland, Ontario; 633 L. O. A.; 70 beam; 29 depth; 11 knots speed: 18 ft. loaded draft; 15,000 D.W.T. TE engs.; 3000 H.P.; keel Nov. 18/25 launched June 23/26; **delivered Aug. 14/26.**

Not named, hull 18, package freighter for Canada Steamships, Ltd.; 230 L.O.A.; 38 beam; 23 depth; keel Oct. 11/26 est.; deliver Apr. 15/27 est.

Not named, hull 19, package freighter same as keel Oct. 11/26 est.; deliver Apr. 15/27 est.

NASHVILLE BRIDGE COMPANY

Nashville, Tenn.

Purchasing Agent: Leo E. Wege.

Hull 107, dredge hull, 124 L.B.P.; 30 beam; 8 draft.; keel Aug. 10/26.

Hull 108, dredge, 110'x51'6"x8'; keel Jan. 1/27 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY

Newport News, Va.

Purchasing Agent: Jas: Plummer, 233 Broadway New York City.

Raymond, Hull 292, diesel electric, 20-in. pipe line dredge, U. S. Engineers, Philadelphia, 230 ft. long; 40 ft. beam; 14 ft. depth; McIntosh & Seymour diesel engs.; keel Nov. 19/25; launched Mar. [illegible] **delivered Sept. 8/26.**

Savarona, hull 303, diesel yacht, 2 screws for R. M. Cadwalader; 174 L.O.A.; 27 beam; 15 ft. 8 in. depth; Winton engs.; keel Jan. 16/26; launched Mar. 20/26; **delivered Oct. 1/26.**

Iroquois, hull 306, passenger and freight steamship for Clyde Steamship Company, New York, 407'-3" overall, 62'-0" beam, 30'-6" depth, Newport News turbines and gear; 8500 I.H.P.; Scotch boilers; oil burning; keel March 20/26; launch Dec. /26 est.

Shawnee, hull 307, sister to above; keel May 15/26, launch Jan./27 est.

No name, hull 315, 18-knot, passenger liner for Panama Pacific Line, New York; 600 ft. long, 80 ft. beam, 52 ft. depth; watertube boilers for oil 22,000 gross tons; 17,000 I.H.P.; keel Mar. 20/26; launch Feb./27 est.

Algonquin, hull 317, passenger and freight steamship for Clyde Steamship Co., New York, 402'-0" overall, 55'-0" beam, 31'-6" depth; Newport News turbines and gears; Scotch boilers for oil burning; keel March 23/26; **launched Sept. 9/26**; deliver Dec./26 est.

Northland, hull 318, coast guard cutter for U. S. Government; 216' long; 39' beam; 24'9" draft; diesel-electric propulsion; McIntosh & Seymour engs.; keel Aug. 16/26.

No name, hull 319, passenger and freight steamer for Red D Line, New York; 335'4" L.O.A.; 51' beam; 22' draft; Newport News turbines and gears; water-tube boilers; 3560 D.W.T.; 4000 S.H.P.

THE PUSEY & JONES CO.

Wilmington, Del.

Purchasing Agent: James Bradford.

John Cadwalader, hull 1030, single screw **pass.-freight steamer for Baltimore & Philadelphia Steamboat Co., Philadelphia; 219 L.B.P.; 45 beam; 11 loaded draft; 14½ mi speed; 4 crank, TE engs. 21-32-35-35 by 24"; two B. & W. water-tube** boilers, 3046 sq. ft. heating surface each; keel Nov. 11/25; launched March 27/26; deliver Oct. 5/26, est.

No name, hull 1031, sister to above.

Not named, hull 1033, steel single screw day steamer for Hudson River Day Line, New York; 252 L.B.P.; 46 beam; 4-cycle, triple expansion engs.; 2800 I.H.P.; 4 B. & W. water-tube boilers; 11x12 200 lbs. pressure; **keel Sept. 15/26.**

SPEDDEN SHIPBUILDING CO.,

Baltimore, Md.

Purchasing Agent: W. J. Collison.

Samson, hull 262, steel hull towboat, G. F. Pettinos, Philadelphia; 87' LOA x 21' beamx11'6" draft: 400 H.P. Ingersoll-Rand diesel engs.; keel March 15/26; **launched Aug. 23/26** deliver Oct. 15/26 est.

STATEN ISLAND SHIPBUILDING COMPANY

Staten Island, N. Y.

Purchasing agent: R. C. Miller.

American Legion, hull 764, ferryboat for City of New York, 264 L.O.A.; 66 beam over-all, 47 beam mld.; 14 loaded draft; 15 mi. speed; abt. 2600 gro. tons; 2 comp. engines, 3500 I.H.P.; 4 W. T. boilers, keel Feb. 8/26; **launched Sept. 29/26.**

No. 33, hull 765, tugboat hull for New York Central R.R.; 96'x26'x10'-3"; 12 knots speed; 200 gr. tons; 650 I.H.P. diesel-electric prop. unit; keel Mar. 29/26; deliver Nov. 1/26, est.

No. 34, hull 766; tugboat, sister to above; keel Apr. 8/26; deliver Dec. 1/26 est.

Meitowax, hull 768, tugboat for Long Island Railroad Co.; 108' L.O.A.; 26' beam; 13'2" molded depth; diesel-electric propulsion; keel June 16/26; deliver Nov. 1/26 est.

Hull 769, grain elevator for International Elevating Co.; 130 L.O.A.; 35 beam; 9 loaded draft forward 11 loaded draft aft; diesel engs.; **keel Sept. 30/26**; deliver Jan./27 est.

Hull 771, wood caisson for Mid-Hudson Bridge.

Hull 772, wood caisson for Mid-Hudson Bridge.

Hull 773, caisson for Howland Hook.

SUN SHIPBUILDING COMPANY

Chester, Penn.

Purchasing Agent: H. W. Scott.

Hull 96, barge for Sun Oil Co. 158-x24-4-x11-3, 150,000 gals. cap.; 150 B.H.P.; keel May 26/26; launched Sept. 7/26; **delivered Oct. 9/26.**

Hull 98, hydraulic dredge for American Dredging Co.; 110x31'10"x10'; keel Aug. 10/26; launch Nov. 15/26 est.

Hull 99, stern-wheel towboat for International Petroleum Co.; 160'x44'x5'; 3'3" draft; 750 I.H.P. engs.; keel Aug. 30/26; launch Nov. 19/26 est.; deliver Dec./26 est.

Hull 100, one oil barge for Proctor & Gamble, 150'x40'x13'; 1200 tons capacity; **keel Oct. 4/26.**

TODD ENGINEERING, DRYDOCK & REPAIR CORP.

Brooklyn, N. Y.

Purchasing Agent: H. J. Shannon.

Sumar, hull 37, steel twin-screw diesel motor yacht for David C. Whitney; 151' LBP; 26' beam; 12' loaded draft; 2 Bessemer diesel engs. 420 S.H.P. each; keel Jan. 19/26; launched April 14/26; **delivered Aug. 30/26.**

Vidor, hull 39, steel twin-screw diesel motor **yacht for S. P. Davis; 162' 10" L.B.P.; 27' 4" beam, 13' loaded draft; 14 mi. speed; 2 Bessemer diesel engs.; 800 S.H.P. ea.; keel March 25/26;** launched May 25/26, deliver Nov. 15/26 est.

THE CHARLES WARD ENGINEERING WORKS

Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Wild Goose, hull 49, stern-wheel diesel towboat, for stock; 180 H.P. diesel engs.; keel Aug. 2/26; **delivered Sept. 25/26.**

Hull 50, steel barge for stock: 150x26x8ft.; keel July 27/26; **launched Sept. 13/26.**

Hull 51, steel barge for W. C. Kelly Barge Line; keel Aug. 12/26.

Hull 52, same as above; keel Aug. 24/26.

Hull 53, same as above.

Hull 54, same as above.

Hull 55, same as above.

Hull 56, same as above.

Hull 57, same as above.

Hull 58, same as above.

Hull 59, same as above.

W. A. Shepard, hull 60, towboat for W. C. Kelly Barge Line; screw propeller, 2 Fairbanks-Morse diesel engs.; 720 B.H.P.; **keel Sept. 23/26.**

Duncan Bruce, hull 61, stern-wheel towboat, for W. C. Kelly Barge Line; 135'x35'x6'; Fairbanks-Morse diesel engs.

Repairs

CHARLESTON DRY DOCK & MACHINERY CO.,

Charleston, S.C.

Purchasing Agent: Charles R. Valk.

Miscellaneous repairs: tugs Jas. H. Clark, Naban, Henry W. Grady, Leopold Addler, power lighter, yacht Edith, fireboat Relief, steamers Vera Radcliff, Rhodesian, Frankfort, Reaper, also a floating dock.

COLLINGWOOD SHIPBUILDING CO.

Collingwood, Ontario.

Purchasing Agent: E. Podmore.

Bottom damage repairs, tail shaft drawn for examination, misc.: stmrs. Glensannox, Glenlivet.

CRAIG SHIPBUILDING CO.,

Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Dock, clean, paint, misc.: yacht Gwyn Wen, three barges, stmr. Bergen, Santiam, tug J. F. Craig, dredge Monterey.

LAKE WASHINGTON SHIPYARDS,

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Repair stem and planks: H. B. Jones, Leonine (also hull), Virginia E. (also hull). Renew rotten wood: Suquamish. Misc.: Morning Star. Engine and hull: ferry Croseline.

LOS ANGELES STEAMSHIP CO.,

San Pedro, Calif.

Paint and voyage repairs: stmr. Montebello. Voyage repairs: stmr. Yorba Linda.

U.S. NAVY YARD

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Dock and misc. repairs: Colorado, Wm. Jones, Henshaw. Misc. repairs: New Mexico, Zeilin, Mahopac, Swallow, Challenge, Pawtucket, Sotoyomo, Tatnuck.

PRINCE RUPERT DRY DOCK AND SHIPYARD,

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Dock, clean, paint, 13 plates renewed and 6 faired; repairs to margin, port side; 18 frames renewed and 20 faired; floors and intercostals in way of damage repaired: stmr. Canadian Coaster. Docked, cleaned, painted, misc.: scow J.A.S. No. 1, 12 fishing boats. Misc. hull and engine repairs: 22 fishing boats. 44 other commercial jobs.

TODD DRY DOCKS, INC.,

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VICTORIA MACHINERY DEPOT CO., LTD.,

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Purchasing Agent: H. S. Hammill.

Dock, clean, paint, misc. repairs: yacht Suva, stmr. Otter, tugs Chehalis, Edna, Grace, Quinitsa, 1 scow, Boiler repairs: tug Olive M., stmr. Grainer. Engine repairs: stmr. Charmer.

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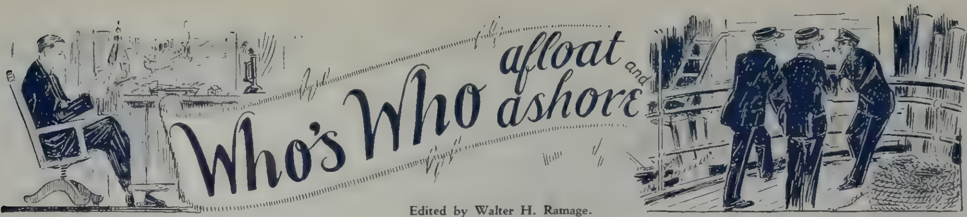
Dry-dock, paint, misc. repairs: Hawaiian Standard, Pawlet, Missourian, Iowan, Coloradan, San Pedro, President Lincoln, Maliko, Leikanger, Eldorado, Dakotan, Hawaiian, Arizonan, Sierra (also remove propeller), San Pedro. Dry-dock, engine, boiler, hull repairs: Jacob Luckenbach, Admiral Schley, A. G. Wells, Lurline, Redline, Wallingford, Mericos H. Whittier, Ventura, Sangro. Drydock, paint, extensive repairs. San Florentino. Engine, boiler, hull repairs: Hauraki (also steward's), Enton (also steward's), Kermit, Tahiti, Waiotapu, Frank G. Drum, Kewanee, Coloradan, Robin Goodfellow, Sinaloa. Propeller repairs: Enterprise, A. G. Wells. Convert to double-end ferryboat: Napa Valley. Dry-dock for survey: Tejon. Misc.: Charlie Watson, Santiam, Salina, Eurana, Mexican, Yorba Linda, West Kasson, Tahchee, Jacob Luckenbach, Maui, W. S. Miller. Lochgoil. Kansan, Oaxaca, Mongolia, Kansan, Kenowis, Richlube, A. L. Kent, Frost, Lansing, Oregonian, Los Alamos, Mahukona, D. G. Scofield, Julia Luckenbach, Narenta, Betterton, Emidio, Lebec, Red Bird, W. H. Libby, Cliona, Nora, Trimountain, Horace X. Baxter, Broad Arrow, Everett, Franklin K. Lane, Redman, Skagway, Haviside Barge No. 3, Smith Rice Barge No. 2, Frederic R. Kellogg, Harvard, Whitney Olson, Katherine, Humboldt, Marie Barre, Montrolite, Fred W. Weller, Adna, San Fernando, Daisy, Malmanger, Roxen, Pacific, Providencia, Sonoma, Johan Poulsen, Missourian, Floridian, Manchuria, West Kasson, Missourian, Lansing, K. I. Luckenbach, Dakotan.

Who's Who afloat and ashore



Edited by Walter H. Ramage.

When it comes to knowing their stuff, McCormick officials have a reputation for "being there." Recently one of their leaders, Norman T. Titus, was selected as the most capable and available man in America to fill a most important post, as Chief of Transportation and Communications in the Bureau of Foreign and Domestic Commerce at Washington.

The shoes of the Manager of Claims and Insurance Department were promptly filled by Edgar R. Parker, who for three years has been Mr. Titus' most valued assistant and a man who is established in the confidence that is secured by twenty years of continual service in his chosen work.

Mr. Parker is a Pacific Coast man, being born and raised in California, having resided in San Francisco most of his life, and his activities have been almost continually centralized in this state. Previous to his association with the McCormick interests, he was at the head of the Claims Department of the Atlantic, Gulf and Pacific Steamship Company, then operating a fleet of ten steamships in the intercoastal trade. Two years as traffic manager with L. H. Butcher & Co., paint and varnish jobbers of this city, and four years as traffic manager with the well known firm of Bishop & Bailer of San Francisco cover the period of Mr. Parker's transportation experience in that particular capacity, while the four years previous to this time found him occupied as a rate clerk with the Southern Pacific Company, preceded by five years before that as an employee of the Santa Fe Railroad.

Three years with the McCormick Steamship Company has built up for "Ed" Parker a host of friends and acquaintances, among men who recognize ability, loyalty and punctuality in a man and his work, and the McCormick Company is to be congratulated in having Mr. Parker in the capacity of manager of Claims and Insurance.

The McCormick Steamship Company now operate forty steamships from Seattle and other Puget Sound Cities to every port of importance on the Pacific Coast of the United States. They also operate a fine fleet of modern steel carriers between these ports and South America, outbound via the Strait of Magellan, and home via the Panama Canal, carrying both passengers and freight. The Munson-McCormick intercoastal fleet operating fifteen big steam vessels from the Atlantic to the Pacific via the Panama Canal, also administered by the McCormick Steamship Company in their San Francisco offices, together with the above, aggregate a total of seventy fine ships.

Edgar R. Parker

The Singing Skipper

Individual deepsea skippers have always been associated with a cognomen illustrating some peculiar trait of character or depicting a hobby. There is, of course, that ancient appellation the "old man" to which every master who ever strode a bridge has answered, and we are all familiar with such characters as the Sea Wolf, Cappy Ricks, Bully Waterman, and others.

Captain James E. Roberts, commander of the Panama Pacific liner Finland, has long been known by his host of friends both on the Pacific and Atlantic as the "Singing Skipper."

This title was given Captain Roberts because of his wonderful baritone voice. On many a voyage before the mast when ship and crew were in the doldrums he has cheered his fellow mates with songs dear to sailors' hearts. Now at the ship's concerts aboard the Finland, as the vessel plies between California and New York, Captain Roberts is always in demand to entertain the passengers with a few of the old chanties. The enthusiasm with which he sings these old ballads of the sea inspires his listeners to the point where they have him sing the choruses over and over again so they may join in.

Captain James E. Roberts

Fair Exchange

Abe Marks, Superintendent of the marine department of the San Francisco Chamber of Commerce, that institution known in the maritime marts throughout the world, was busily engaged one evening recently in compiling some shipping figures.

His work was interrupted by a gentleman with two travelling bags. "Say," said the visitor as he glanced at the two ponderous books that resemble a hotel register, but are used for the entry and sailing of liners out of the port of San Francisco, "I would like to engage reservations."

"Reservations, for what?" queried Marks.

"For a room," was the reply.

"Sorry," explained Marks, "but this is the marine department of the Chamber of Commerce—not a hotel."

"Well, I certainly beg your pardon," said the stranger. "I am a new-comer to San Francisco and came up California Street from the Ferry building, after arriving from the East, and thought this was a hotel."

Marks directed the visitor to one of the leading hotels, after presenting him with a city guide and a copy of "Fascinating San Francisco."

Hollywood Afloat

Some of the finest ship scenes ever depicted in the movies have been "shot" aboard the coastwise passenger liner Emma Alexander of the Admiral Line fleet. In fact, the Emma Alexander is perhaps the outstanding liner afloat as far as being favored by the movie directors to "shoot" scenes of life aboard ship. The reason for the popularity of this vessel for these purposes is due to the general construction of the ship, which permits elaborate settings to be staged on her spacious decks and engine room.

According to that veteran of the sea, Chief Engineer B. K. Martland, some of the most realistic sea settings

(Continued on Page 20)

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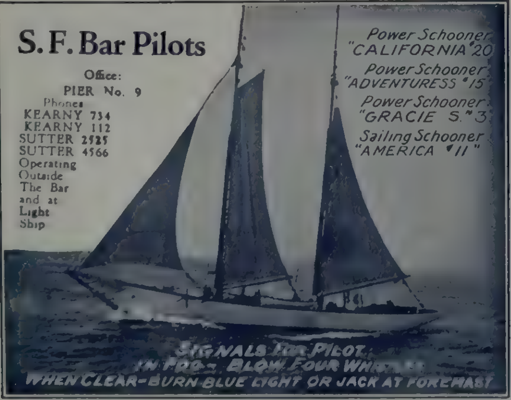
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SAILINGS—Every 20 days from Seattle, Tacoma, Portland, Astoria, San Francisco, Oakland, Alameda, and Los Angeles to Charleston, S.C.

ARGONAUT STEAMSHIP LINE

Norton, Lilly & Company, general agents.
400 Yeon Building. Phone Atwater 2661.
FREIGHT ONLY.

SAILINGS—Every 2 weeks between Vancouver, Seattle, Portland, San Francisco, Los Angeles, New York, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.

ARROW LINE

Columbia-Pacific Shipping Company, agents.
Porter Building. Phone Bdwy. 5360.
FREIGHT ONLY.

SAILINGS—Westbound.
Weekly from Baltimore, fortnightly from Norfolk and Savannah to Los Angeles, San Francisco, Oakland, Portland, and Seattle.

ISTHMIAN STEAMSHIP LINES

Norton, Lilly & Company, general agents.
Yeon Building. Phone Atwater 2661.
FREIGHT ONLY.

SAILINGS—Intercoastal Service.
Every 5 to 7 days between Vancouver, Seattle, San Francisco, Los Angeles, San Diego and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.

SAILINGS—Hawaiian Service.
Monthly from Baltimore to Hawaii via San Diego and Los Angeles; also monthly direct to Hawaii from Philadelphia, Boston, and New York.

LUCKENBACH LINES

Luckenbach Steamship Company, Inc.
Spalding Building. Phone Broadway 4378.
FREIGHT ONLY.

SAILINGS—North Atlantic—Intercoastal.
Every Tuesday from Seattle, every Saturday from Portland, every Thursday from San Francisco, and every Saturday from Los Angeles; also every seven days from Vancouver, Tacoma and Oakland, to Philidelphia, New York, and Boston.

SAILINGS—Gulf. Every 16 days from Seattle, Tacoma, Vancouver, Portland, San Francisco, Oakland and Los Angeles to Galveston, Houston, New Oreans, and Mobile.

MUNSON-McCORMICK LINE

McCormick Steamship Company.
McCormick Terminal. Phone Broadway 8322.
FREIGHT ONLY.

SAILINGS—Weekly betweenn New York and Baltimore (westbound), and Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.

SAILINGS—Semi-monthly between Philadelphia, Boston (westbound), and Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.

SAILINGS—Pacific Havana Jacksonville Line.
Monthly from Seattle, Tacoma, Portland, San Francisco, and Los Angeles to Havana, Cuba, and Jacksonville, Florida.

PACIFIC-CARIBBEAN GULF LINE

Swayne & Hoyt, Inc., managers.
408 Board of Trade Bldg. Phone Bdwy. 2503.
FREIGHT ONLY.

SAILINGS—Semi-monthly from Seattle and Puget Sound, Portland and Columbia River, San Francisco and Los Angeles to Houston, Beaumont, New Orleans, Mobile, Tampa, Curacao, Puerto Colombia, and Gulf of Mexico ports as inducements offer, via Panama Canal. Call at Oakland westbound.

NORTON, LILLY & COMPANY
General Agents, Pacific Coast

ISTHMIAN STEAMSHIP LINES
(Intercoastal Service)
Sailings Every 5 to 7 Days from Vancouver, Seattle, San Francisco, Los Angeles, San Diego, to New York, Boston, Providence, Portland, Me., Philadelphia and Baltimore, Norfolk.

ARGONAUT STEAMSHIP LINE
(Intercoastal Service)
Sailings Every 2 Weeks from Vancouver, Seattle, Portland, San Francisco, Los Angeles, San Diego, to New York, Boston, Portland, Me., Providence, Philadelphia and Baltimore.

PAN-PACIFIC LINE
(Pacific Coast Ports-West Coast South America Service)
Regular Fast Freight Service from Pacific Coast Ports to Paita, Callao, Mollendo, Arica, Iquique, Antofagasta and Valparaiso (other ports as inducements offer.)

ELLERMAN & BUCKNALL S. S. CO., Ltd.
(Pacific-United Kingdom-Continent Service)
Monthly Sailings from Vancouver, Seattle, Portland, San Francisco, Los Angeles, San Diego to London, Hamburg, Hull and other United Kingdom and Continental Ports as Inducements Offer. Through Bills of Lading Issued to Scandinavian, Baltic, Portuguese, Spanish, Mediterranean and Levant Ports with Transhipment at Hull.

SOCIETE GENERALE DE TRANSPORTS MARITIMES A VAPEUR
(Pacific-Mediterranean Service)
Sailings from Vancouver, Seattle, Portland, San Francisco, Los Angeles and San Diego to Genoa and Marseilles and Other Mediterranean Ports as Inducements Offer.

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230 CALIFORNIA ST., SAN FRANCISCO
CABLE ADDRESS "VERNOTCH"

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MAIN OFFICE: NEW YORK, 26 BEAVER STREET

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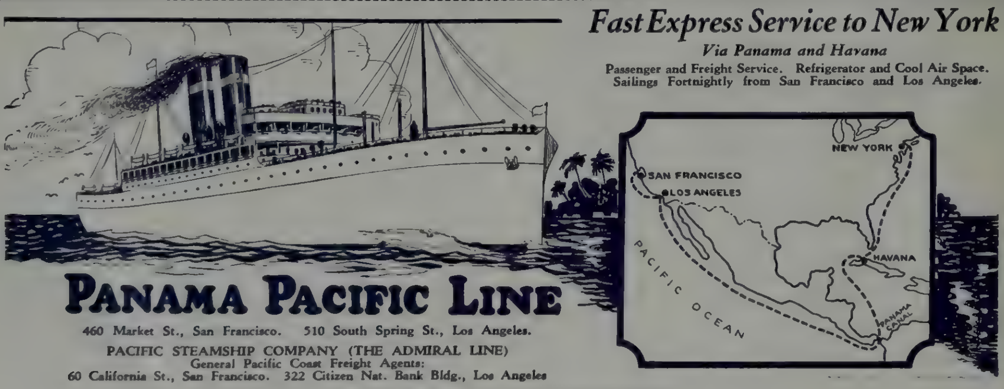
General Agents Pacific Coast
260 California Street, San Francisco
Phone—Douglas 8040-841-8042
B. W. GREER & SON, LTD., Agents, Vancouver
NORTON, LILLY & COMPANY, Agents Portland, Seattle, Los Angeles and San Diego



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460 Market St., San Francisco. 510 South Spring St., Los Angeles.
PACIFIC STEAMSHIP COMPANY (THE ADMIRAL LINE)
General Pacific Coast Freight Agents:
60 California St., San Francisco. 322 Citizen Nat. Bank Bldg., Los Angeles

INTERCOASTAL

PANAMA-PACIFIC LINE
International Mercantile Marine Company.
Pacific Steamship Company, freight agents.
PASSENGER AND FREIGHT.
SAILINGS—Regular intervals between New York and San Diego, Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.

QUAKER LINE.
Columbia Pacific Shipping Co., General Agents.
Porter Building. Phone Broadway 5360
FREIGHT ONLY.
SAILINGS—Every two weeks between Philadelphia and Los Angeles, San Francisco, Oakland, and Portland.

VANCOUVER

ARGONAUT STEAMSHIP LINE
B. W. Greer & Son, Ltd.
602 Hastings St., West. Phone Seymour 7929.
FREIGHT ONLY.
SAILINGS—Every two weeks between Vancouver, Seattle, Portland, San Francisco, Los Angeles, and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.

CANADIAN GOVERNMENT MERCHANT MARINE, LTD.
B. C. Keely, Pacific Coast manager.
Phone Seymour 8420.
FREIGHT ONLY.
SAILINGS—Every 30 days, Vancouver to Montreal (to Halifax during close of navigation). Through bills of lading from other Pacific Coast ports.

ISTHMIAN STEAMSHIP LINES
B. W. Greer &Son, Ltd.
602 Hastings St., West. Phone Seymour 7929.
FREIGHT ONLY.
SAILINGS—Intercoastal Service.—Every 5 to 7 days between Vancouver, Seattle, San FranFrancisco, Los Angeles, San Diego and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.
SAILINGS—Hawaiian Service.—Monthly from Baltimore to Hawaii via San Diego and New Angeles; also monthly direct to Hawaii from Philadelphia, Boston, and New York.

ORIENTAL

SAN FRANCISCO

AMERICAN-AUSTRALIA-ORIENT LINE
Swayne & Hoyt, Inc., Managing Operators.
(Operating U.S.S.B. vessels).
430 Sansome Street. Phone Karny 2600.
FREIGHT ONLY.
SAILINGS—Regular Intervals from Los Angeles, San Francisco, thence direct to Yokohama, Kobe, Shanghai, Hongkong, Manila and Singapore. Also calls at Dairen, Taku Bar, Saigon and Cebu if inducements offer.

DOLLAR STEAMSHIP LINE
The Robert Dollar Co.
311 California street. Phone Garfield 4300.
Oakland office: 406 Thirteenth St.
PASSENGERS AND FREIGHT.
SAILINGS—Weekly from San Francisco to Honolulu, Kobe, Shanghai, Hongkong, Manila, Fortnightly to Singapore, Penang, and Colombo.
FREIGHT ONLY.
SAILINGS—Regular sailings between San Francisco and Yokohama, Kobe, Shanghai, Hongkong, Manila, Singapore, Sourabaya, Samarang, and Batavia.
SAILINGS—Guam Service.—Regular sailings between San Francisco, Pearl Harbor, Hawaii, Guam, Cavite (Manila), and Java.

KERR LINES
240 Battery Street. Phone Karny 4100.
General Steamship Corporation, Agents
FREIGHT ONLY.
SAILINGS—Monthly from Los Angeles and San Francisco to Philippines, Japan, China, Dutch East Indies, and Straits Settlements.

MITSUI & COMPANY, LTD.
(Mitsui Bussan Kaisha, Ltd.)
Merchants Exchange Bldg. Phone Sutter 3414.
FREIGHT ONLY.
SAILINGS—Monthly from San Francisco to Portland and North Pacific ports, thence to China and Japan.

NIPPON YUSEN KAISHA
551 Market Street.
PASSENGERS AND FREIGHT.
SAILINGS—Liners in the California-Orient service sail fortnightly from San Francisco for Japan and China ports via Honolulu. One sailing every six weeks of liners in the Orient-California-Chile service. These ships call at Mexican, Canal, and South American ports. The Oriental ports of call are Yokohama, Kobe, Moji, and Hongkong.

OREGON ORIENTAL LINE
(Operating U. S. S. B. vessels).
Columbia Pacific Shipping Company.
Sudden & Christenson, agents.
230 California street. Phone Garfield 2846.
FREIGHT ONLY.
SAILINGS—Every 3 weeks from Portland to Orient, calling at Yokohama, Kobe, Shanghai, Taku Bar and Dairen, returning via San Francisco.
SAILINGS—Every two weeks from Portland to Yokohama, Kobe, Hongkong and Manila, returning direct to Portland.

OSAKA SHOSEN KAISHA
Williams, Dimond & Co., agents.
310 Sansome St. Phone Sutter 7400.
FREIGHT ONLY.
SAILINGS—San Francisco Service.
Monthly service to and from Yokohama, Kobe, Moji, Shanghai, Hongkong and Singapore.
PASSENGERS AND FREIGHT.
SAILINGS—Los Angeles Service—A steamer a month to Koke, Yokohama, Yokkaichi, Nagasaki, Hongkong, Saigon, Singapore, Colombo, Durban and Cape Town. These vessels are operating in round-the-world service and on their home-bound trip call at Santos, Buenos Aires, Rio de Janeiro, New Orleans, the Panama Canal and Los Angeles.

YAMASHITA KISEN KABUSHIKI KAISHA
Yamashita Company, Inc., agents.
403 Alaska Commercial Bldg. Phone Gar. 3899.
FREIGHT ONLY.
SAILINGS—Semi-monthly from Puget Sound and Portland to Yokohama and Kobe and irregular service from China and Japan ports to San Francisco, Portland, and Seattle.

SEATTLE

ADMIRAL ORIENTAL LINE.
City ticket office: Fourth at University.
General Offices: 1519 Railroad Ave. So.
PASSENGERS AND FREIGHT.
SAILINGS—Every 12 days between Seattle, Tacoma, Victoria, B.C., Yokohama, Kobe, Shanghai, Hong Kong, and Manila.

AMERICAN ORIENTAL MAIL LINE.
General Office: 1519 Railroad Ave. So.
FREIGHT ONLY.
SAILINGS—Regular service to Vladivostok, Dairen, Tientsin, Taku Bar, Tsingtao, Shanghai, and Japan ports on either outward or homeward voyages, as freight offers justify direct call.
SAILINGS—Monthly service to Yokohama, Kobe, Shanghai, Foochow, Amoy, Swatow, Manila, Cebu and Iloilo.

BLUE FUNNEL LINE, LTD.
Dodwell & Co., Ltd., agents.
Stuart Building. Phone ELiot 0147.
PASSENGERS AND FREIGHT.
SAILINGS—Every 21 days from Vancouver, Victoria, and Seattle to Yokohama, Kobe, Miike, and Hongkong.

R. T. JOHNS & COMPANY
R. T. Johns & Company, agents.
Central Building. Phone ELiot 7697.
FREIGHT ONLY.
SAILINGS—Tramp service between Seattle and Oriental ports of Yokohama, Kobe, Nagoya, Shimidzu and Moji.

MITSUI & COMPANY, LTD.
(Mitsui Bussan Kaisha, Ltd).
American Bank Building. Phone ELiot 1450.
FREIGHT ONLY.
SAILINGS—Monthly from San Francisco, Portland, Seattle and Puget Sound ports, thence to China and Japan.

NIPPON YUSEN KAISHA
Colman Building. Phone ELiot 3513.
PASSENGERS AND FREIGHT.
SAILINGS—Every 10 days, calling at Victoria or Vancouver, B. C., Yokohama, Kobe, Nagasaki, Shanghai, Hongkong, or other Oriental ports as inducements offer.

OCEAN TRANSPORT CO., LTD.
General Steamship Corporation, agents.
Colman Building. Phone ELiot 5706.
FREIGHT ONLY.
SAILINGS—Fortnightly from Portland, Puget Sound, and Vancouver to Japan and North China ports.

OSAKA SHOSEN KAISHA
Pier 6.
PASSENGERS AND FREIGHT.
SAILINGS—Regular fortnightly service to Yohama, Kobe, Moji, Dairen, Shanghai, Manila and Hongkong.

SUZUKI & COMPANY, Ltd.
Dexter-Horton Bldg. Phone Main 7830.
FREIGHT ONLY.
SAILINGS—Irregular service between Seattle and Japanese ports

THORNDYKE SHIPPING CO.
L. C Smith Building. Phone MAin 3168.
FREIGHT ONLY.
SAILINGS—Regular service between Puget Sound, Grays Harbor, Vancouver and Yokohama, Kobe, Osaka and Nagoya.

WALKER-ROSS, INC.
L. C. Smith Building. Phone ELiot 1074.
FREIGHT ONLY.
SAILINGS—Regular service between Seattle, and Yokohama, Kobe, Osaka, and Nagoya.

YAMASHITA KISEN KABUSHIKI KAISHA
Yamashita Company, Inc., agents.
Central Building.
FREIGHT ONLY.
SAILINGS—Every 2 weeks from Seattle to Yokohama, Kobe, Osaka, and Nagoya.

LOS ANGELES

AMERICAN - AUSTRALIA - ORIENT LINE.
Swayne & Hoyt, Inc., Managing Operators.
(Operating U.S.S.B. vessels).
703 Transportation Bldg. Ph. Broadway 2618.
FREIGHT ONLY.
SAILINGS—Regular intervals from Los Angeles and San Francisco, thence to Yokohama, Kobe, Shanghai, Hongkong, Manila, and Singapore. Also calls at Dairen, Taku Bar, and Saigon and Cebu if inducements offer.

DOLLAR STEAMSHIP LINE
Passenger office: 514 West 6th Street. Phone TRinity 4891.
Freight office: Central Bldg., 6th and Main Sts.
PASSENGERS AND FREIGHT.
SAILINGS—Weekly from Los Angeles and San Francisco to Honolulu, Kobe, Shanghai, Hongkong, Manila. Fortnightly to Singapore, Penang, and Colombo.
FREIGHT ONLY.
SAILINGS—Regular sailings between Los Angeles, San Francisco and Yokohama, Kobe, Shanghai, Hongkong, Manila, Singapore, Sourabaya, Samarang, and Batavia.

KAWASAKI-ROOSEVELT LINE
General Steamship Corporation, agents.
541 So. Spring street.
FREIGHT ONLY.
SAILINGS—Twice a month from Los Angeles direct to Yokohama, Kobe, Shanghai, Manila, Sourabaya, Samarang, Batavia, Singapore.

KERR LINES
541 South Spring Street.
General Steamship Corporation, Agents.
FREIGHT ONLY.
SAILINGS—Monthly from Los Angeles and San Francisco to Philippines, Japan, China, Dutch East Indies, and Straits Settlements.

NIPPON YUSEN KAISHA.
19 Biltmore Hotel Arcade.
PASSENGERS AND FREIGHT.
SAILINGS—Monthly liners Korea Maru and Siberia Maru, from San Francisco and Los Angeles to the Orient. Every 6 weeks of liners in the Orient-California-Chile service. These ships call at Mexican, Canal, and South American ports. Oriental ports of call are Yokohama, Kobe, Moji, and Hongkong.

OSAKA SHOSEN KAISHA
McCormick & McPherson, agents.
Transportation Bldg. Phone VAndike 6171.
PASSENGERS AND FREIGHT.
SAILINGS—A steamer a month to Kobe, Yokohama, Yokkaichi, Nagasaki, Hongkong, Saigon, Singapore, Colombo, Durban, and Cape Town. These vessels are operating in round-the-world service and on their home-bound trip call at Santos, Buenos Aires, Rio de Janeiro, New Orleans, Panama Canal and Los Angeles.

Columbia Pacific Shipping Co.
STEAMSHIP OWNERS, OPERATORS, AGENTS, CHARTERING BROKERS
General Offices: Porter Building, Portland, Ore.
DIRECTORS:
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K. D. Dawson H. B. Van Duzer
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Eastern Knight
Hannawa
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UNITED AMERICAN LINES
INTERCOASTAL SERVICE
REGULAR SAILINGS—FREIGHT ONLY
New York, Baltimore and Savannah to San Francisco, Portland, Astoria, Seattle.

PACIFIC COAST - EUROPEAN SERVICE
REGULAR SAILINGS—PASSENGER, FREIGHT, REFRIGERATOR
Seattle, Portland, Astoria, San Francisco to Liverpool, Glasgow, London, Hull, Bremen, Hamburg, Antwerp
GENERAL AGENTS PACIFIC COAST
QUAKER LINE
INTERCOASTAL SERVICE
REGULAR SAILINGS—FREIGHT ONLY
Philadelphia to Los Angeles, San Francisco and Portland
MANAGING OPERATORS
OREGON ORIENTAL LINE
United States Shipping Board Steamers
TRANS-PACIFIC FREIGHT SERVICE
Portland and Astoria, Ore., to Yokohama, Kobe, Shanghai, Tsingtao, Taku Bar, Tientsin, Dairen, Hongkong and Manila. Transshipment at Shanghai to American River Steamers for Nanking, Pukow, Hankow and Other Open Yangtze River Ports.
Through Bills of Lading Issued to and from Points Beyond Port of Call.

NORTH PACIFIC COAST LINE
JOINT SERVICE OF
HOLLAND-AMERICA LINE
THE ROYAL MAIL STEAM PACKET COMPANY
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The Pioneer Refrigerator Service

Fast Freight and Passenger Service between San Francisco, Los Angeles Harbor, Portland, Astoria, Seattle, Tacoma, Victoria and Vancouver, and Liverpool, London, Glasgow, Rotterdam, Antwerp and Hamburg.

All Vessels Equipped With Refrigerators for Transportation of Fish, Fruits and Other Perishable Cargo
FOR PARTICULARS APPLY
HOLLAND-AMERICA LINE
120 Market Street San Francisco, Cal.

Who's Who Afloat and Ashore

(Continued from Page 13)

that have ever been presented on the silver screen have been taken on the Emma Alexander. There have been times as she ploughed the Pacific on her regular schedule that as many as three companies from movieland have been "shooting" scenes at one time, much to the delight of sea voyagers.

Two Youthful Skippers

Commodore J. H. Trask was strolling along the boat deck of his vessel, the Oceanic liner Sierra, an hour before the ocean carrier was to clear for the Antipodes.

"Hello, Captain Trask," said a rather youthful appearing young man, "bet a dollar you don't remember me."

Commodore Trask, whose eyes have scanned the horizon for more than forty years during his sea career, replied:

"While I can't recall your name, your face is familiar and, by George, you sailed under me twenty years ago!"

"You win, skipper," I am Captain January, master of the Dollar liner President Pierce. "I was just strolling along the front, when I decided to drop on board in the hope I would have an opportunity of saying hello to an old shipmate."

Captain January, one of the youngest skippers sailing the Pacific, served as quartermaster under Commodore Trask twenty years ago on vessels of the Oceanic Line out of the port of San Francisco. Both masters chatted for nearly an hour, relating their experiences since their last meeting. They arranged for a get-together celebration when both skippers return to this port with their commands.

At left: Captain J. H. Trask of the Sierra; at right, Captain January of the President Pierce.

MISCELLANEOUS NOTES

The roadway leading up to the site or the new Lookout Station of the Marine Department of the San Francisco Chamber of Commerce has been completed and materials are now being rushed for the building, which is expected to be completed by January 1, 1927. When it is finished San Francisco can boast of the finest lookout station in the United States. Living quarters have been provided for the attendant who will be on duty day and night. Elevation and plans of this station were published in the October issue of Pacific Marine Review.

Captain John Wallace, port admiral of the Bar Pilot Association, San Francisco, recently returned from Los Angeles, where he attended the Elks Convention.

A. P. Hammond, manager of the California & Eastern Steamship Company of Los Angeles, was a recent visitor in San Francisco.

George Armes, president of the General Engineering & Drydock Company, is serving in a new role—that of valet and cook for two blooded German police dogs named Max and Hulda. Daily he may be found groom-

Continued from Page 22)

ORIENTAL

PORTLAND

MITSUI & COMPANY, LTD.

(Mitsui Bussan Kaisha, Ltd.)
616 Porter Bldg. Phone MAin 4113.

FREIGHT ONLY.

SAILINGS—Monthly from San Francisco to Portland and North Pacific ports, thence to China and Japan.

OCEAN TRANSPORT CO., LTD.

General Steamship Corporation, agents.
Motoramp Building. Phone Broadway 6714.

FREIGHT ONLY.

SAILINGS—Fortnightly from Portland, Puget Sound, and Vancouver to Japan and North China ports.

OREGON ORIENTAL LINE

(Operating U. S. S. B. vessels).
Columbia Pacific Shipping Company.
Porter Building. Phone Broadway 5360.

FREIGHT ONLY.

SAILINGS—Every 3 weeks from Portland to Orient, calling at Yokohama, Kobe, Shanghai, Taku Bar and Dairen, returning via San Francisco.

Every 2 weeks from Portland to Yokohama, Kobe, Hongkong, and Manila, returning direct to Portland.

TATSUUMA KISEN KAISHA

Walker Ross, Inc., General Agents.
Board of Trade Bldg. Phone Broadway 7574.

FREIGHT ONLY.

SAILINGS—Monthly from Portland to Yokohama and Kobe; or Osaka, Nagoya as inducements offer.

YAMASHITA KISEN KABUSHIKI KAISHA

Yamashita Company, 1109 Porter Building.

FREIGHT ONLY.

SAILINGS—Semi-monthly from Puget Sound and Portland to Yokohama and Kobe, and irregular service from China and Japan ports to San Francisco, Portland, and Seattle.

VANCOUVER

BLUE FUNNEL LINE, LTD.

Dodwell & Co., Ltd., agents.
Yorkshire Building. Phone Seymour 9576.

PASSENGERS AND FREIGHT.

SAILINGS—Every 21 days from Vancouver, Victoria, and Seattle to Yokohama, Kobe, Miike, and Hongkong.

CANADIAN PACIFIC STEAMSHIPS, LTD.

Canadian Pacific Railway Station. Phone Seymour 2630.

PASSENGERS AND FREIGHT.

SAILINGS—Every 14 days from Vancouver to Japanese ports, Shanghai, Hongkong, and Manila

OSAKA SHOSEN KAISHA

Empire Shipping Company, Ltd.
815 Hastings St., W. Phone Seymour 8014.

PASSENGERS AND FREIGHT.

SAILINGS—Every 2 weeks to all ports in Japan and China, also Vladivostok, Singapore, Bombay, etc.

SUZUKI & COMPANY, Ltd.

B. L. Johnson, Walton & Company, agents.
837 Hastings street, W. Phone Seymour 7147.

FREIGHT ONLY.

SAILINGS—Irregular service between Pacific Coast ports and Japan ports.

WALKER-ROSS, INC.

Canadian American Shipping Company, Ltd.
Phone Seymour 2198.

FREIGHT ONLY.

SAILINGS—Regular service to Yokohama, Kobe, Osaka, and Nagoya.

YAMASHITA KISEN KABUSHIKI KAISHA

Yamashita Co., Inc.
Merchants Exchange Building.

FREIGHT ONLY.

SAILINGS—Every 2 weeks to Yokohama, Kobe, Osaka, and Nagoya.

UNITED KINGDOM—Continental Europe

SAN FRANCISCO

EAST ASIATIC COMPANY, LTD.

The East Asiatic Company, Inc., agents.
433 California street. Phone Sutter 6717.

PASSENGERS AND FREIGHT.

SAILINGS—Regular service, Pacific Coast ports, direct to Hamburg, Hull, Copenhagen, with trans-shipment to all Scandinavian and Baltic ports.

ELLERMAN & BUCKNALL STEAMSHIP CO., LTD.

Norton, Lilly & Company, general agents.
230 California street. Pone Sutter 3600.

FREIGHT ONLY.

SAILINGS—Monthly from Vancouver, Puget Sound, Portland, San Francisco, Los Angeles, San Diego to Liverpool, London, Hull and other United Kingdom and Continental ports as inducements offer. Through bills of lading issued to Scandinavian, Baltic, Portuguese, Spanish, Mediterranean and Levant ports, via Hull.

FRENCH LINE

(Compagnie Generale Transatlantique).
General Steamship Corporation, sub-agents.
240 Battery street. Phone Kearny 4100.

FREIGHT ONLY.

SAILINGS—Fortnightly from Vancouver, Seattle, Portland San Francisco and Los Angeles to French and other Continental and United Kingdom ports via Panama Canal and West Indies.

FURNESS LINE

Furness, Withy & Company, Ltd.
Furness (Pacific), Ltd.
710 Balfour Building. Phone Karny 6880.

PASSENGERS AND FREIGHT.

SAILINGS—Fortnightly from Vancouver, Seattle, Tacoma, Portland, San Francisco and Los Angeles to London, Liverpool, Manchester, and Glasgow.

GENERAL STEAMSHIP CORP.

240 Battery street. Phone Kearny 4100.

FREIGHT ONLY.

SAILINGS—From Pacific Coast ports to London, Hull, Leith, Scandinavian, and Irish ports as inducements offer.

HARRISON DIRECT LINE

Balfour Guthrie & Company.
351 California street. Phone Sutter 6427.

FREIGHT ONLY.

SAILINGS—Every 30 days from Vancouver, Victoria, Seattle, San Francisco, Oakland, and Los Angeles to United Kingdom. From August to December, sailings fortnightly.

ISTHMIAN STEAMSHIP LINES

E. C. Evans & Sons, general agents.
260 California street. Phone Davenport 8040.

FREIGHT ONLY.

SAILINGS—Every 3 weeks from Vancouver, Seattle, Portland, San Francisco, Los Angeles and San Diego to London, Liverpool, Avonmouth, and other United Kingdom ports as inducements offer.

JOHNSON LINE

W. R. Grace & Co., general agents.
332 Pine street. Phone Sutter 3700.

PASSENGERS AND FREIGHT. (Refrigeration.)

SAILINGS — Monthly between Pacific Coast ports and Bergen, Oslo, Gothenberg, Malmo, Copenhagen, Stockholm, and Helsingfors

NAVIGAZIONE LIBERA TRIESTINA

General Steamship Corporation, agents.
240 Battery street. Phone Kearny 4100.

PASSENGERS AND FREIGHT.

SAILINGS—Mediterranean Service.
Monthly sailings from Pacific Coast ports to Trieste, Leghorn, Genoa, Naples, and Barcelona; also Canary Islands.

PASSENGERS AND FREIGHT.

SAILINGS—African Service.
Monthly from Pacific Coast ports; through bills of lading being issued for principal ports of West, East, and South Africa, with transshipment at Genoa or Naples.

NORTH PACIFIC COAST LINE

(Joint service of the Royal Mail Steam Packet Company and Holland America Line).
120 Market street. Phone Douglas 7510.

PASSENGERS AND FREIGHT.

SAILINGS—Every 2 weeks between Vancouver, Puget Sound, Columbia River, San Francisco, Oakland, Los Angeles, and Liverpool, London, Rotterdam, Antwerp, Hamburg, Havre, Glasgow.

NORWAY PACIFIC LINE

485 California street. Phone Sutter 5099.

FREIGHT ONLY.

SAILINGS—Every 30 days from San Francisco and Los Angeles to United Kingdom, Continental ports and Scandinavia.

SOCIETE GENERALE DE TRANSPORTS MARITIMES A VAPEUR

Norton, Lilly & Company, general agents.
230 California street. Phone Sutter 3600.

FREIGHT ONLY.

SAILINGS—From Seattle, Portland, San Francisco, and Los Angeles to Marseilles and Genoa as inducements offer.

UNITED AMERICAN LINES, INC.

Sudden & Christenson, Pacific Coast agents.
230 California street. Phone Garfield 2846.
For passengers. Phone Sutter 46.

PASSENGERS AND FREIGHT.

SAILINGS—Fortnightly from Vancouver, Seattle, Portland, San Francisco, and Los Angeles, to Antwerp, Hamburg, and Bremen; with call at United Kingdom ports when inducements justify.

SEATTLE

EAST ASIATIC COMPANY, LTD.

The East Asiatic Company, Inc., agents.
1222 Alaska Building. Phone ELiot 9104.

PASSENGERS AND FREIGHT.

SAILINGS—Regular service, Pacific Coast ports direct to Hamburg, Hull, Copenhagen, with trans-shipment to all Scandinavian and Baltic ports.

ELLERMAN & BUCKNALL STEAMSHIP CO., LTD.

Norton, Lilly & Company, general agents.
Alaska Building. Phone ELiot 2450.

FREIGHT ONLY.

SAILINGS—Monthly from Vancouver, Puget Sound, Portland, San Francisco, Los Angeles, San Diego to Liverpool, London, Hull and other United Kingdom and Continental ports as inducements offer. Through bills of lading issued to Scandinavian, Baltic, Portuguese, Spanish, Mediterranean and Levant ports, via Hull.

FRENCH LINE

(Compagnie Generale Transatlantique).
General Steamship Corporation, agents.
Colman Building. Phone ELiot 5706.

FREIGHT ONLY.

SAILINGS—Twice a month from Vancouver, Seattle, Portland, San Francisco, Los Angeles to French and other Continental and United Kingdom ports via Panama Canal and West Indies.

FURNESS LINE

(Furness, Withy & Company, Ltd).
Furness (Pacific), Ltd.
Burchard & Fisken, Inc., agents.
705 Arctic Building.

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(Continued from Page 20)

ing these canines and preparing their meals—all this in the kennels provided on the roof of the company's quarters at 1100 Sansome Street, San Francisco. Mr. Armes boasts the finest roof garden in the down-town industrial district, all due to the vigilance of Max and Hulda, who under the careful tutorship of their master have been schooled to maintain "watch," their only mission being to frighten feathered miscreants away.

Many of the interested spectators at the launching of the Key System ferryboat Peralta (recently enacted at Moore's shipyard, Oakland) feared it would not be successful on account of the absence of the traditional "hard Kelly" of Bill Grant, the veteran builder at the Moore Yards. It is even said by some that the Peralta seemed to hesitate on her way as a mark of protest against this breach.

Bill could not be located after the launching to make an explanation and his friends when asked to give their opinion merely shake their heads or shrug their shoulders.

Frank K. Hitching, formerly connected with the ship brokerage firm of Griffith and Hitching has been appointed operating manager of W. L. Comyn and Co. Mr. Hitching will take up his duties in Seattle about the middle of November.

Chief Engineer Hazzard of the Southern Pacific automobile ferry San Mateo is no mean artist, as can be attested by a visit to the engine room of the bay carrier on which he presides over the engineering department.

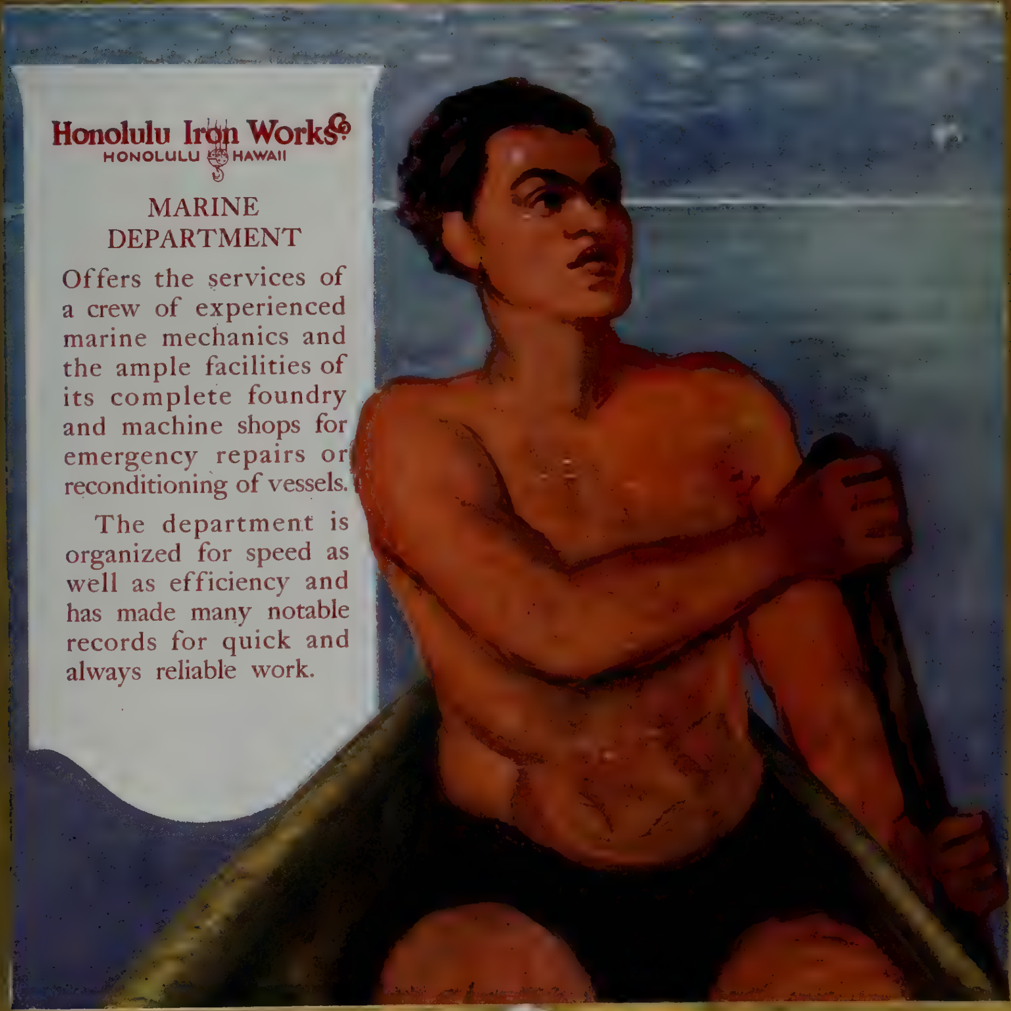
For some time, Chief Hazzard has devoted his attention to color schemes. Recently he struck upon one with which he was satisfied. He brought the matter to the attention of the port officials of the San Francisco company, and they assigned a squad of painters to apply the color scheme to the engine room.

The scheme has been given a fair trial and it is reported that vision troubles of the engine room crew have been alleviated. Chief Hazzard is willing to give his formula to all engineers interested.

Pacific Marine Review

The National Magazine of Shipping

December, 1926



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Pacific Marine Review, Vol. 23, No. 12, Published Monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $2.00 a year.

S. P. Steam Ferry San Mateo. The new S. P. Diesel Electric Ferries will be similar in design but will have the following dimensions: Length O.A. 256 feet; Beam 44 feet; Depth 19 feet; Displacement 1600 tons; Capacity 90 automobiles.

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DECEMBER 1926 Vol. XXIII. No. 12

Pacific Marine Review

The National Magazine of Shipping

Official Organ Pacific American Steamship Association

576 Sacramento Street, San Francisco

Member of Pacific Traffic Association

Official Organ Shipowners' Association of the Pacific

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year: domestic, $2; foreign, $3; single copies, 25c.

Alexander J. Dickie Editor.

Paul Faulkner, Advertising Manager

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Save the Shipbuilder

THE shipbuilders of America need ships to build. They are therefore intensely interested in favorable action from Congress on the Overseas Trade Act, or Pepper Bill. This act would extend the American protective tariff policy to ships built in American shipyards for foreign trade through a rebate paid by the federal government to the shipowner who is having such ships built.

Any shipowner who considered building a ship for foreign trade would, under existing federal law, be entitled to apply for a loan from the Shipping Board Construction Loan Fund under very favorable terms. In consideration of this loan, the ship would have to be built to comply with Shipping Board ideas as to speed, type, and suitability for war service, and would be available for government use in any emergency.

The Overseas Trade Act proposes that on each ship built for foreign trade, the tariff that would have had to be paid if the materials composing the ship had been imported, shall be computed and the amount thus obtained, not to exceed 30 per cent of the ship's cost, shall be paid by the government to the shipowner as a rebate. It is calculated that this will bring the cost of a ship for foreign trade down to approximately the cost of a similar ship built in a British shipyard. The bill proposes to create a fund from which such rebates shall be paid by setting aside for that purpose net profits of Panama Canal operation and interest payments on loans from the Construction Loan Fund.

The Pepper bill was considered at the last session of Congress and will be a live measure at the coming session. We bespeak for this measure the interest of every American citizen. Its passage will undoubtedly encourage shipbuilding and shipbuilding circulates a larger proportional payroll than does any other industry.

Compensation for Marine Workers

IN the last session of Congress there was presented a Federal Compensation Bill for Maritime Workmen. This bill proposes more liberal awards of compensation than any similar legislation ever attempted. It came to be known among shipowners as the "Confiscation Bill." It is not dead or even sleeping and will be very much alive at the next session.

The attempt to pass this measure has brought into the limelight all the legal confusion surrounding the status of the maritime worker—confusion primarily caused by the fundamental differences between admiralty and civil law procedure and practice. The necessity for a federal maritime workers' compensation law is chiefly to clarify the legal situation and to insure a uniform and fair compensation for specific injuries. Since the proposal now before Congress covers only shoreside maritime workers and omits the seamen, it thereby fails to clarify and does not insure uniformity.

During the past summer the shipowners and waterfront employers of the Pacific Coast have drafted a bill which includes all maritime workers under compensation and which makes very liberal provision based on the California statute, which is the most liberal in force anywhere. This proposed bill has been subject for several months to the critical scrutiny of the best legal talent, the most practical ship operators, the most expert safety engineers, and the keenest executives of stevedoring companies that the Pacific Coast can produce. After numerous changes and with the 100 per cent approval of the Pacific Coast, it is now being submitted to a similar procedure on the Atlantic Coast, and when complete will be presented to Congress as a substitute for the measure now pending.

We have read this bill carefully. It is fair, just, equitable, with a very evident leaning toward the standpoint of the employe rather than that of the employer. It takes away no rights from the employe and it insures that every employer shall respect all rights of the employe.

The passage of this bill by Congress would certainly place maritime employment on a much more stable basis.

The Liner California

THE new intercoastal passenger and freight liner under construction at the Newport News Shipbuilding & Drydock Company for the Panama Pacific Line is to be named California. The choice of this name was to express the appreciation of the Panama Pacific Line for the support given to it by California business and travel interests and to show the personal admiration of President P. A. S. Franklin, operating head of the International Mercantile Marine, for the State of California.

The California will be a notable vessel. She is the largest steamship yet built in America and is the first large commercial vessel of her class to be equipped with turbo-electric machinery. Accommodations are being provided for 334 first-class and 363 tourist class passengers. There will be capacity for 8000 tons of freight, including large refrigerated and air cooled space for California perishable products. The public rooms on the California will be furnished and decorated in American colonial style after originals in the Metropolitan Museum of Art in New York City. Mural paintings by a well known American artist representing romantic historic scenes of Spanish voyages and discoveries on the Pacific Coast will form one of the feature motifs of the decorations. These scenes have been chosen with special reference to the Isthmus of Panama and the coast of California.

The California will be launched in July of 1927 and will enter the intercoastal service in the fall of 1927, her first sailing from New York being set for the latter part of October. It is expected that the California will be followed by two similar vessels for the same service, the three representing an investment of about twenty-one million dollars.

Boat Operators Organize

THE most recent cooperative movement on the Pacific Coast came to a climax this fall with the formation of the Bay and River Boat Owners Association of Stockton, California.

The operation of bay and river freight boats and towing services on San Francisco Bay and tributary waters have been largely a matter of hit and miss growth, expanding to meet seasonal and permanent development of water transportation. In recent years the possibilities of entering this business with second-hand boats purchased at very low figures has created a considerable amount of confusion in the rate structure and in rebating practice, and as a consequence of this confusion the need of an association for mutual protection has been forced upon the permanent firms engaged in the buisness.

The Bay and River Boat Owners Association was therefore formed and Captain Ben Walters, president of the Island Transportation Company of Stockton, was elected president, with Charles Crandall of the Vehmeyer Transportation Company of Stockton, as secretary. The membership at a recent date included eighteen of the principal boat operating firms of the San Joaquin River, delta region, and upper bay, and is growing with great rapidity.

The principal present function of this association is to combat rebating and rate cutting and to place the workboat and lighterage business on a standardized basis, doing away with ruinous competition. Undoubtedly as the association expands it will find other useful outlets for its energy.

Pacific Marine Review extends to this new association its best wishes for success in achieving the purpose indicated.

Water, Water, Everywhere — and Many Tons to Drink

ONE of the most remarkable trends in modern steamship passenger travel is the tremendously increasing demand for fresh water. According to a recent bulletin issued by the International Mercantile Marine Company at New York, Captain Roger Williams, superintendent of operations of that company in New York, has recently made exhaustive study and tabulation of the water supplied to some of the leading modern liners, including the Majestic. These figures show that the average consumption of fresh water by third-class passengers crossing the Atlantic today is never less than 15 gallons a day, and the consumption by first-class passengers runs as high as 50 gallons a day per passenger on the larger ships. The average consumption in the first cabin in a number of modern liners was found to be 40 gallons per passenger a day.

This consumption of water is not confined to the passengers. On these same modern liners, each member of the crew requires not less than 15 gallons of fresh water a day. The ships represented carry crews of from 500 to 1100 persons, and those fond of using their pencils can figure the quantity required for the crew alone in the course of a year.

It is surprising, therefore, to find that the Majestic's fresh water tanks hold no less than 4750 tons and those of the Belgenland 2750 tons. The favorite type of post war transatlantic passenger liner—ships of around 21,000 tons register—carry about 1800 tons of fresh water apiece.

Contrast these figures with the advertisements of transatlantic steamers in the 60's of the last century. The hand bills then used made special talking point of the claim that on certain lines each passenger had an allowance throughout the voyage of as much as 3 pints of fresh water a day. Under such conditions it requires no great stretch of imagination to picture what would happen to any member of the crew or passenger list of such ship who had the temerity to ask for fresh water for a bath, or even a morning wash.

Special attention is paid on all modern liners to the matter of filtering water. On the majority of first-class ships, fresh water is filtered three times before being used to drink and twice before it is allowed to run to the bath rooms. Illness attributable to drinking water is practically unknown on the modern liner.

The growing tendency to provide private baths and showers for first class cabins is constantly increasing the use of fresh water, and it is becoming a matter of growing importance in marine engineering to use all possible means for cutting down the waste of fresh water to a minimum.

America Will Have Merchant Marine

PHILIP S. Teller, commissioner of the United States Shipping Board, after making a complete analytical review of the thirty-one regional meetings recently held in all parts of the United States, declares as his measured opinion that—

"The United States will have an American merchant marine compatible with the position this nation now occupies and will continue to occupy, in the broad proposition of commerce and national safety.

In practically every city visited resolutions were adopted, which are in a measure the recommendations of the different communities to the United States Shipping Board as to what should be embodied by the Board in its report to Congress. While these resolutions are not in complete harmony, they agree on the following substantial features:

1. An American merchant marine for commerce and national security is unanimously favored.

2. This merchant marine, in the opinion of a vast majority, should be ultimately privately owned, but that financial aid must be given by the government either directly or indirectly if we are to accomplish this in the immediate future. Meanwhile, until it can be transferred to private ownership, the government should own and operate the ships to insure the permanency of a merchant marine. A minority declared for permanent government ownership and operation.

3. Production in the United States far exceeding consumption, American shipping is necessary in foreign trade. Trade routes now established should be continued, and new ones added to be operated under the supervision or control of the United States until they can be made profitable and then turned over to private owners.

4. Regular service on all trade routes and a modification of the Seamans Act to promote economy and efficiency of operation.

5. A definite policy of replacement, reconstruction and modernization of American ships to compete with competition of foreign ships.

6. The financial aid to be given, should not be in the nature of a direct subsidy, but should take the form of payment for service rendered."

Shipping Needs A Tonic

GENERAL Dalton, president of the Emergency Fleet Corporation, deems it expedient for Congress to reaffirm the policy that the United States must have a merchant marine commensurate with its overseas trade and to provide appropriations from which new ships may be built that are to be designed for particular trades.

An article in a recent issue of a marine periodical of wide circulation states:

"That for more than 60 years the American merchant marine problem has been a football of politics and a solution is no nearer today than it was 35 years ago."

Such statements tend to create an impression that the affirmation by Congress in the Merchant Marine Act of 1920 was idle prattle, a mere gesture; and so far as any effectuation of that policy is concerned, such impressions may be warranted. Certainly it has not caused the American investing public to become interested in merchant shipping, but expressions of policy will not promote and maintain an American merchant marine. What is needed at the present time is not a reaffirmation of a policy, but the putting into effect of some practical plan to carry out a purpose which was announced in 1920 but which has not had much kick behind it.

Coupled with the expression of policy in the Merchant Marine Act were several provisions designed to make the operation of vessels under the American flag possible, but unfortunately those sections have never been given effect. It is true the plans suggested met with considerable opposition from various sources, but the significant thing is that they, like every other plan that has been enacted or suggested during the past fifty years to encourage American shipping, for one reason or another never became effective.

To provide impractical, ineffective plans, or plans that will not be enforced, is as bad as providing no plans at all.

It is true that some new vessels of particular types are required to round out our fleet of merchant vessels, but even if Congress were to provide them that alone would not solve our shipping problems. It might afford temporary relief but it would have no permanent value, as no private concern can afford to build or purchase vessels that cannot be operated in competition with foreign flag steamers.

Temporarily aiding shipping might prove more harmful than beneficial. If our shipping problems are to be solved, the basic difficulties of ship operations under the American flag must be determined and a practical remedy provided. This remedy must be tonic rather than stimulative in order to encourage the desired permanent growth and expansion of our merchant shipping.

American investors have too often been burned with shipping securities to easily be misled with temporary, ineffective, and impractical plans of promoting American shipping. Had some plan for aiding shipping been evolved at the time the Merchant Marine Act became a law, it would be unnecessary at this time to talk of the government providing new ships adapted to particular trades. The experience of private operation would have dictated the necessity for such new tonnage and would also have informed them what types of vessels were best adapted for each particular trade and during the six years since the enactment of that Act private shipping companies would have been able to make provision to meet these needs.

As it eventuated, the most potential nucleus of an American merchant marine (our war time fleet of merchant vessels) has for the most part become obsolete and useless, without affording the United States the entre it should have into merchant shipping. Over three million tons of our war time fleet of steel vessels are today tied up and the cost of fitting them for service demonstrates that a large percentage of these vessels will never leave the "bone yard."

If this country is serious in its desire to have a merchant marine under the American Flag, we must find some plan of making operation possible, and then enforce that plan as a nation. Not only must this be done, but it must be done without further delay.

Certainly the time has come for putting into effect a plan of promoting shipping under the Stars and Stripes. We cannot obtain sound advice from our competitors on the seas. We must solve the problem ourselves and not be too sensitive about it. If we abide by the wishes of our competitors, then the fellow who wrote about the United States shipping problem having been a "football" knew whereof he spoke.

(Bulletin No. 7, American Merchant Marine Association.)

Imports Up; Exports Down

DECLINING European markets and an excess of imports over exports comprise the story of the foreign trade of the United States for the first half of the current year as told in "Our World Trade," compiled by the Department of Foreign Commerce of the Chamber of Commerce of the United States.

"Exports to Europe fell off heavily," runs the foreword, "every one of our chief European markets buying less this year than last, with the single exception of Denmark.

"Wheat and wheat flour, rye, raw cotton, and copper exports showed conspicuous declines. Lard and tobacco, however, rose to higher positions in the export list. Agricultural implements and various other machinery lines and some iron and steel items showed large export gains.

"Imports increased strikingly in many lines; rubber, news print paper, gasoline and hydraulic cement reached six-months' record levels. Coffee and pig iron imports have been very heavy.

"Imports from Europe, as from most other sections, gained. Germany was prominent in the list of our European imports."

Some of Bethlehem's 1926 Products

BAY TANKERS

During the past two years a number of these steel, shallow draft, diesel engine propelled tankers have been built at the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., San Francisco. We illustrate here Bethlehem's latest product of this type, the Associates, built for the Associated Oil Company of San Francisco. The Associates is 160 ft. long, 38 ft. beam, and carries 4000 barrels of oil on 7-ft. draft. Her power plant consists of two 110-horsepower, 3-cylinder Union diesels. On recent trials on San Francisco Bay she made an excellent showing.

FERRYBOATS AND TANKERS

Our illustration at the left shows the steam vehicle ferry New Orleans in her slip on the San Francisco waterfront. This type of hull, carrying 75 to 80 automobiles, has come to be a standard on San Francisco Bay. Six of these ferries with steam power plants have been built by Bethelehem for San Francisco Bay use and three with diesel-electric power plants are now under construction at the Union Plant. With the diesel-electric drive and a slight rearrangement of the main deck, this ferry carries 95 automobiles.

Below is shown the General Petroleum Corporation's tanker Lio. This vessel was converted early in 1926 from steam to diesel propulsion by the installation of a Bethlehem 2-cycle 3000-horsepower marine type diesel engine. She has now been in service for eight months, giving very good satisfaction to her owners and operators and performing in a way very creditable to the builders of her engines. It is hoped that the Lio is only the first of a long line of conversion jobs in the dieselization of the Pacific Coast tanker fleets.

PRINCE RUPERT

This most northerly of the major shipbuilding plants of the Pacific Coast is thoroughly equipped with all classes of shops and with modern shipbuilding ways. The sectional floating drydock of 20,000 tons combined capacity, together with ample deep water alongside, enables this plant to handle nicely repair jobs of almost any magnitude. A fine coast patrol vessel and a small freight and passenger lake steamer have been built here during 1926.

Pacific Coast Shipbuilding

The Basic Industry with the Largest Proportional Payroll Should Receive the Greatest Public Support

SHIPBUILDING and ship repair distribute to labor a larger proportion of gross income than does any other major industry. This fact is due to variation in product and in job, which makes standardized duplicate machine production impractical. At the close of the World War, when the United States Shipping Board continued and enlarged its war-born shipbuilding program, there was much criticism about wasting government funds. Many economists have since attributed to this program the tiding over of the expected post-war panic in industry.

During the war and post-war boom in shipbuilding, the shipyard equipment of America was largely expanded and, as a natural consequence, the shipbuilders of America have for the last four years been going through a period of depression and readjustment. Those yards which were purely of the war-baby type have been liquidated, in most cases at a heavy loss, the sites being sold for terminal or industrial purposes and the plant largely scrapped. Old established shippards, however, have directed their attention toward ship repair, ship reconditioning, and toward using their shop facilities and the professional talent in their organizations in building up a business in various engineering specialties and in the fabrication of structural steel.

This phase of readjustment has been particularly noticeable among Pacific Coast yards. Where the skilled labor market is more limited, it is more necessary for each yard to hold its organization together so as to be able to bid reasonably on the occasional major repair job that promises to show a profit. The Pacific Coast has a very efficient ship repair plant and is adequately prepared to take care of any minor or major repairs to any ship afloat. These Pacific Coast ship repair facilities are available at job rates more reasonable than are similar facilities in any other part of America, and the billing charges for Pacific Coast labor in ship repair are less than prevail in other coast sections.

A recent check up on the hourly billing rates for labor on dry-docks shows that the average for 15 trades was $1.39 per hour on the Atlantic Coast and $1.19 per hour on the Pacific Coast.

For this reason and on account of the freedom from

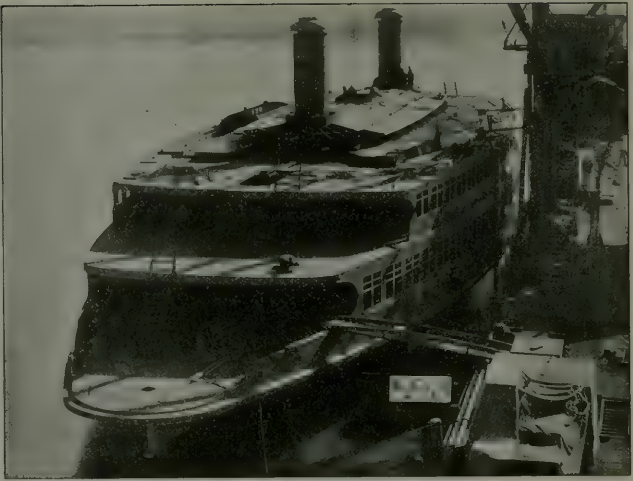
(Continued on Page 543)

WOODEN SHIPBUILDING

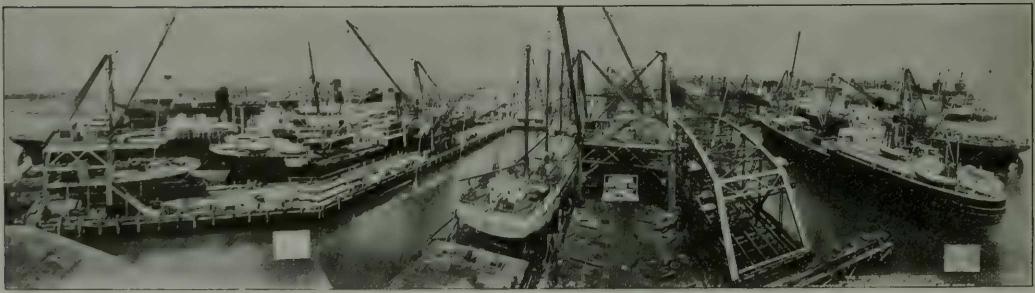
There are many establishments for building small and large wooden ships located in practically every port on the Pacific Coast. A typical wooden shipbuilding yard, and one that has been turning out some excellent work, is that of J. C. Johnson at Port Blakely, Washington, a view of which is shown at the left. This yard is equipped with a 200-ton marine railway and is prepared to construct all classes of wooden vessels. Several cannery tenders and sixteen large scow barges have been built during 1926.

THE MOORE DRY DOCK COMPANY

During 1926 the Moore Dry Dock Company has done a considerable amount of special engineering work and structural steel fabrication, and the dock and repair facilities have been kept fairly busy, as is evidenced by the panoramic view shown below with 21 vessels undergoing repairs at the same time on the docks and at the outfitting wharves of this plant. In addition to this work, new construction has included the two de luxe passenger ferries for the Key System Transit Company, one of which is shown under construction in the upper view, and a large steel carfloat for the Santa Fe Railroad. Two diesel-electric ferryboats for the Northwestern Pacific Company are now under construction at this yard.



The Moore Dry Dock Company In 1926



GENERAL ENGINEERING

The General Engineering & Drydock Company, at its yard in Alameda, California, has been busy on a large number of repair jobs and in construction of the wooden ferryboat Golden State for the Golden Gate Ferry Company. At the present writing, this yard has laid down the keels for three wooden ferryboats and one steel ferryboat. The views herewith show the erection of additional facilities for adequately taking cars of this work—two new shipbuilding ways have been laid down and two fine electric traveling, semi-portable cranes of 65 tons capacity have been erected.

General Engineering and Drydock Company

climatic interruption and the greater dock space available, the Pacific Coast yards have been getting an increasing proportion of the voyage repair and reconditioning work on intercoastal vessels. The tremendous increase in coastwise and intercoastal tonnage is another factor that is conspiring not only to bring repair work to Pacific Coast yards but to keep alive the hope that a large replacement program imminent in the near future would bring about a revival of shipbuilding.

A slight foretaste of this is being experienced on San Francisco Bay at the present time in the construction of transbay ferryboats. Eleven of these boats, representing a total cost of over seven million dollars, are now under construction in San Francisco Bay shipyards. This means a temporary revival of shipbuilding on the San Francisco waterfront and on the Oakland Estuary that is most welcome after a long period of empty ways.

From Los Angeles also we hear of the large reconditioning job on the President Arthur, now being changed into a first-class passenger liner for the Los Angeles-Honolulu run, and of major repair contracts on other vessels that will keep fifteen hundred men busy through the winter at the plant of the Los Angeles Shipbuilding & Drydock Corporation.

Wooden shipbuilding in special types of patrol boats, small coastwise steamers, and large fishing craft has accounted for quite large activity and no small investment in Pacific Coast yards during the past few years.

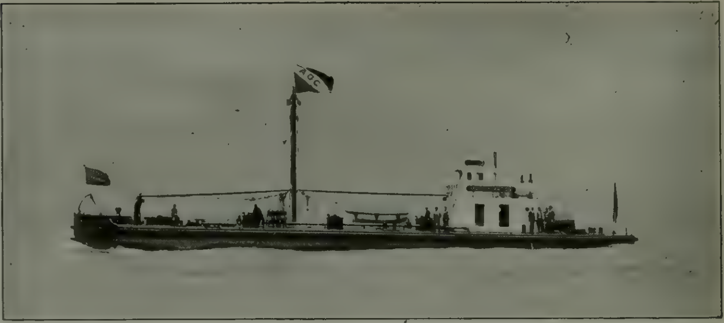
Notwithstanding all this work, however, the life of the shipbuilder has been far from rosy, and he has had a hard struggle to hold organization and plant together. In this struggle he is still engaged and he deserves and should get a far greater measure of public sympathy and support than is ordinarily accorded. There are no other industries to which public support can be given with greater returns to the public treasury than to the building and operating of ships, and in the United States there are no other industries to which less public support is given. We in this respect reverse the policies that have been found wise in every other maritime nation. Through the Shipping Board we are paying in operating losses each year an amount sufficient to stimulate private building and ownership of ships to take care of all essential services. At the same time through various regulatory legislation we are hampering all private operations and making private operation in the foreign trade absolutely impracticable.

We have shipbuilding plants second to none in the world. We have ship operating brain and nerve equal to any in the universe. We have capital to spare for any enterprise showing a profit. If our representatives at Washington will do the right thing by our shipowners, ship builders, and ship operators, a privately owned American merchant marine under the Stars and Stripes would soon be ploughing the ocean tracks of the world with profit and honor, and the shipbuilding yards of the United States be busy turning out modern products of the shipbuilders art.

All signs point to the realization of this hope in the not far distant future. The country is gradually being educated to the ship-minded stage and when the country sees the light, legislators suddenly become far-

THE HANLON YARD.

The Hanlon Shipbuilding & Drydock Company, favorably located on the Oakland Estuary, Oakland, California, is prepared to undertake the construction, repair, or reconditioning of all classes of steel and wooden vessels. The yard is equipped with two marine railways, one of which is capable of hauling out 12,000 tons and is well fitted out with all the necessary shops. Our illustration herewith shows a recent product of this yard—the Bay tanker Motormates of the Associated Oil Company.



sighted. So let the Pacific Coast shipbuilder tighten up his belt another hole, smile a little more grimly, and hold his grip, for a new day is about to break and there is much room for new construction to take care of Pacific Ocean needs.

It is a very significant fact in this connection that the rate of growth in water-borne tonnage is much faster on the Pacific Coast than in any portion of the earth's coastline.

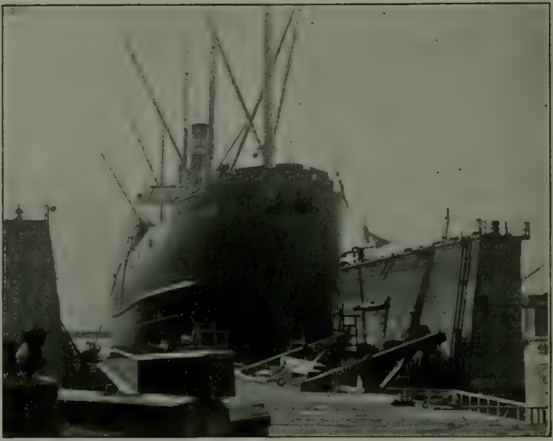
In total tonnage passing over marine terminals, San Francisco registered last year 24,759,540 long tons, giving her the premier position on the Pacific Coast and placing her as second only to New York in the United States.

Los Angeles, with 18,047,629 tons, is the third port in the United States, and Seattle, with 7,171,792 long tons, is the tenth.

These three ports alone account for 50 million tons a year in round numbers and the grand total of all the Pacific Coast ports is well in excess of the 62 million ton mark hung up by the port of New York.

Pacific Coast water-borne commerce is increasing at the rate of approximately 18 per cent annually. That rate has been showing a very definite acceleration during the past three years, and we may confidently look to see the water-borne tonnage of Pacific Coast ports double its present figure well within the next decade.

Such figures certainly call for a large extension and replacement program for our coastwise, intercoastal, and overseas merchant marine.



LONG BEACH SHIPBUILDING

Late in 1925 Long Beach harbor and entrance channel were dredged to a depth of 32 feet. Since that time there has been considerable activity in this harbor, affording a good bit of repair and reconditioning work to the Craig Shipbuilding Company. This firm has a modern plant, strategically located on the inner harbor at Long Beach and equipped to build and repair all classes of steel and composite ships, and with a floating drydock capacity to take care of 3500 tons.

Our illustration above shows the Craig Shipbuilding Company drydock with the Samoa up.

LOS ANGELES YARD

The Los Angeles Shipbuilding and Drydock Corporation reports considerable activity, at the present time having a payroll of about 1600 men, largely engaged in the reconditioning job on the liner City of Honolulu and on the large hull repair job to the tanker Solano. The work now in the yard represents a total business of approximately $3,000,000. Our illustration is taken from a very unusual photograph showing the condition of the bottom of the tanker Solano and taken on the drydock of the Los Angeles Shipbuilding & Drydock Corporation.

National Congress for Industrial Safety

An Account of the Fifteenth Annual Safety Congress of the National Safety Council, October 25-29, 1926 at Detroit

By Norman F. Titus, Chief, Transportation Division, Department of Commerce.

THE presence of five thousand men at the Detroit Safety Congress gives ample evidence of widespread interest in safety affairs on the part of the American people. The extent to which the idea of safety has permeated the fabric of the business of this country is disclosed by the range of the activities listed in the sixty-four page program. Thirty-one sections, representing as many business and professional interests, seated themselves to listen to definite programs followed by animated round table discussions. Some of the most active and largely attended sections were those on chemicals, petroleum, electric railways, public utilities, and steam railroads. Notwithstanding that the size of the congress made it necessary to hold meetings in three of Detroit's largest hotels, the coordination of program was not impaired and one was impressed with the thoroughness of the organization of the conference. In planning the program on Safety, no aspect of this vital subject had been overlooked; for instance, sections on safety in the school and the home offered ample opportunity for the women delegates and visitors to participate actively.

The industrial sections were attended largely and testified the extent to which the safety idea has permeated this sphere of business. Evidently, in industry, safety is the order of the day and commonly accepted as good business practice. The marine section, one of the largest groups to embrace the idea of organized safety as a factor in its enterprise, at no session had more than twenty-five in attendance. The presence of this enthusiastic little group, however, indicates that maritime interests have at least adopted this forward movement.

Program of Maritime Section

The following program of the marine section reveals the wide sphere of opportunity for organized maritime safety work:

Essentials of Maritime Safety—D. N. Hoover, Supervising Inspector General, U. S. Steamboat Inspection Service, Department of Commerce, Washington, D.C.

The Navy's Contributions to Safety at Sea—Lieut. Commander H. H. J. Benson, U. S. N., Naval Hydrographic Office, Washington, D.C.

General Observations on the subject of Marine Safety—H. H. Raymond, President, Clyde Steamship Company, New York City.

The Licensed Officer's Interest in Safety—Capt. Luther B. Dow, Secy.-Treas., American Steamship Licensed Officers' Association, Inc., New York City.

Safety from an Operator's Viewpoint—Capt. Asa F. Davison, Vice-President, Black Diamond Steamship Corporation, New York City.

Ship Safety Activities of the Texas Company—Arthur M. Tode, Superintendent, Technical Division, Marine Department, The Texas Company, New York City.

Hazards of the Maritime Industry from the Life Insurance Point of View—A. D. Reiley, Mutual Life Insurance Company, New York City.

The Development of Statistics for the Marine Industry—Capt. Irving L. Evans, Vice-President, the United States P. & I. Agency, Inc., New York City.

The Urgent Need for Safety on Board Ship and Ashore—F. P. Foisie, Seattle.

Safety Engineering As Applied to Ship Building—Ralph E. Prouty, Aetna Life Insurance Company, New York City.

Protection and Indemnity Insurance in the United States—Andrew J. Smith, Marine Office of America, New York City.

Actual Experiences with Ship Safety Committees—George A. Marr, Secretary-Treasurer, Lake Carriers Association, Cleveland.

The status of Safety Work on the Pacific Coast—N. F. Titus, Chief, Transportation Division, Department of Commerce, Washington, D.C.

Maritime Safety—F. W. Mitchell, Director of Personnel, N. Y. N. H. and H. Railroad Co., New Haven, Connecticut.

Accident Prevention Work in Passenger, Automomile and Freight Ferry Service—William S. Wollner, Northwestern Pacific Railroad Co., San Francisco.

Lake Carriers' Experience

Several papers were of particular significance to Pacific Coast shipping interests. One of the most inspirational was that of George A. Marr, Secretary-Treasurer, Lake Carriers Association, Cleveland, on "Actual Experiences with Ship Safety Committees." Due to the fact that their business is confined chiefly to the transportation of coal and ore, the Lake Carriers have practically no safety problem ashore, as loading and discharging is accomplished by mechanical devices. For approximately twelve years, however, they have maintained a safety program on shipboard and their experience should prove highly valuable to those who have adopted this movement only recently.

In his paper, Mr. Marr sets forth that the basis of their safety procedure was the organization of safety committees among the crews. On each ship the Committee on Safety consists of six men, three from the deck and three from the engine department. It is further provided that the lowest licensed officer on each end of the ship is to be a member of the committee. These committees are required to hold at least one meeting a month; each member receives an attendance fee of $2 for each meeting. These committees report their recommendations on safety matters to the Secretary-Treasurer of the Lake Carriers Associations and then these reports are carefully scrutinized and worthwhile suggestions are mimeographed and sent to the committees on all the four hundred and twelve vessels in the association.

Mr. Marr explained that at previous congresses he had already described in detail the remarkable success that had attended their efforts in reducing accidents, both minor and fatal, so that for this meeting he was prepared to present some of the more unique mechanical devices recommended by ships' safety committees. He presented to each member of his audience a pamphlet containing a drawing and an explanatory note of each device that he was going to discuss. These devices were for catching mail boat lines, safely lifting hatch leaves, safeguarding against hot ashes and clinkers, landing poles, bar preventing backwinding of winches, safeguarding deadlights, grappling hook, ladder guards, rod-iron becket, manila becket, boiler-plate jack, and for many other purposes.

After discussing these arrangements, Mr. Marr also presented each member of the audience with a thirty-six page booklet containing the Lake Carriers' recommendations for the prevention of accidents aboard ship. These are very comprehensive suggestions, based on long experience, outlining in detailed fashion rules for safety procedure respecting lights, hatches, ladders, hand rails, gratings, gear, machinery, and other equipment. Mr. Marr signified a willingness to supply anyone with a copy of this pamphlet on application to his office, 905 Rockefeller Building, Cleveland, Ohio. Any person interested in safety work should send for a copy.

The Bulletin which the Lake Carriers publish monthly is a further evidence of the progressiveness of this body. The Bulletin is now in its fifteenth volume and even a cursory glance convinces a reader of its great value. It summarizes in detail the wide range of activities of the association, emphasizing the free schools in navigation and engineering, also insurance and savings plans, safety progress, welfare work, personalities, and similar items of interest. The subject matter is accurate, even technical, but the style is so simple, the suggestions so readily applicable, and the make-up so attractive that it would appeal to the humblest member of the crew, as well as the captain.

With these pamphlets as tangible evidence, Mr. Marr's address convinced every member of his audience of the great strides the Lake Carriers Association had made in humanizing their business and inspired his hearers to emulate this remarkable leadership.

Marine Safety and Life Insurance

A second address which was interesting through its informative subject matter was one given by A. D. Reiley, Mutual Life Insurance Company, New York City, on "Hazards of the Maritime Industry from the Life Insurance Point of View." This paper gauged the necessity for safety work from the angle of actuarial statistics. There was a startling reality in Mr. Reiley's remark that "the death rate from accident among those whose duties keep them on rivers, lakes, sounds, and harbors was three times the normal; among those on the Great Lakes, four times; among those in the coastwise trade and on ocean steamers five times the normal." He gave his listeners further food for thought when he pointed out that "English compensation figures show that fatal accident rates are higher in the shipping industry than in any other of the seven large groups of industries, not even excluding mines or quarries." He presented ample figures to justify this statement and brought out further the remarkable fact that, bad as is the English casualty record, the accidental death rate is noticeably lower than the American experience. Unquestionably Mr. Reiley demonstrated the necessity for safety work in maritime affairs.

Nationalizing Marine Safety Program

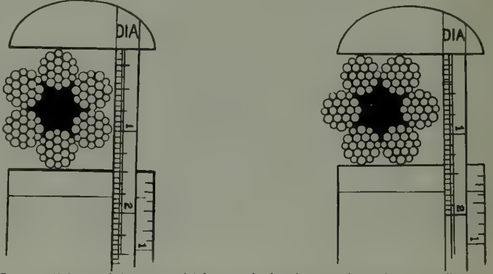
All of the addresses were highly interesting and informative, but it remained for F. P. Foisie of Seattle to amalgamate all of these ideas into a constructive plan for nationalizing the safety movement. He reviewed, in a succulent manner, the status of the maritime safety work to date; he clearly demonstrated the "urgent necessity for organized safety activity coming to a head." The chief points in his argument were:

1. A sharp and continuing increase in accidents, reflected by mounting insurance costs with more stringent clauses.
2. The necessity for management in shipping to accept the principles of workmen's compensation in a Federal Maritime Workmen's Compensation Law in lieu of extension of employers liability acts.
3. The likelihood that a government authority will shortly be created to prescribe safety practice standards.

He closed his address by making a plea to organize the industry on a national scale. This suggestion aroused general discussion which resulted in the consensus of opinion being expressed that the executive committee should evolve a definite proposal to the American Steamship Owners' Association to join the Lake Carriers and the Pacific Coast associations in a vital, constructive, national safety program. To this program the incoming officers pledged their support.

Turning to the lighter side of the convention, we must note in passing the delightful program of entertainment that was provided. A spirit of informality prevailed at the reception and dance given the first evening as a get-acquainted party. This was followed by a series of sectional luncheons, a convention banquet, and a rollicking party the last evening. Interspersed with this merry-making were entertaining trips to Detroit's industrial plants, country clubs, and scenic drives.

Both at work and at play the convention was a tremendous success.



Correct (left) and incorrect (right) methods of measuring wire rope diameters.

How To Measure Wire Rope

THERE is only one way to correctly measure wire rope and that is shown, in contrast to the incorrect method, by the accompanying illustration.

It is highly important that the proper size of rope be employed since an undersized rope will not give the degree of service that should reasonably be expected, while an oversized rope represents needless investment and will not properly operate over sheaves grooved for smaller ropes. More important, however, is to have the rope and the sheave properly fitted.

Wire rope should not be allowed to travel over a sheave wherein the groove is too small for its diameter.

A pinching sheave will do more damage to a wire rope in one hour than a properly grooved sheave in an entire week or more.

Sheaves grooved 1/16-inch larger than the diameter of the rope will lengthen the life of the rope several times, as compared with rope life on pinching sheaves.

Since sheaves are cheaper than good wire rope, there is small economy in continuing the operation of improperly grooved sheaves.

Also, the tread diameter of the sheave or drum greatly affects rope life. Large diameter sheaves should be used wherever possible.

(Data furnished by American Cable Co.)

American Ship St. Stephen

By F. C. Matthews.

The American ship St. Stephen at dock under the lee of Telegraph Hill, San Francisco

THE St. Stephen was the sixteenth full rigged ship built by the two brothers Isaac Flint Chapman and Benjamin Flint Chapman (afterwards known as Benjamin Flint) who established shipyards at Damariscotta, Maine, in 1840 under the firm name of Chapman & Flint. After a few years they moved to Thomaston and later, in 1867, to Bath. Among their productions were a number of ships which were named after Saints, these being the first St. James, the first St. Mark, the first St. Charles, and the St. Lucie, St. Nicholas, St. John, and St. Paul, all of which preceded the St. Stephen. In 1877 the firm was dissolved but four more "Saints" were built, the ships St. David and St. Frances and the barks St. James and St. Katherine.

The St. Stephen was launched in January, 1877 and was well built of oak, being classed A 1, Red, for 15 years. She registered 1392 tons, and was 208 feet 5 inches by 40 feet 5 inches by 23 feet 7 inches. To the nautical eye she was a beauty, with a finely modeled hull, lofty masts, and long, tapering spars, all finished in the natural wood, varnished. Bulwarks and housings were of pure white and kept in such fine condition as to resemble porcelain. When in port, with yards braced dead square, standing rigging newly tarred and oiled, running rigging neatly coiled, brass work bright and shining, and decks holystoned and oiled, she was admired by landsmen as well as by mariners. All this meant, of course, that something had always been found for her crew to do, and in fact her captain was a driver.

During her whole sea life the managing owner of the St. Stephen was Benjamin Flint and her captain was William E. Douglas. The latter had served his apprenticeship in Grand Bank fishing schooners and in 1871 was master of the schooner C. R. Flint of Bath. This schooling has always been considered about the hardest in the world, one that furnishes the most capable though hardest officers afloat. Captain Douglas was no exception to the rule and was noted as an exceptionally daring driver. It is said that on one trip from England he drove the St. Stephen down the Channel at a 17 knot clip during a gale when other vessels were hove to.

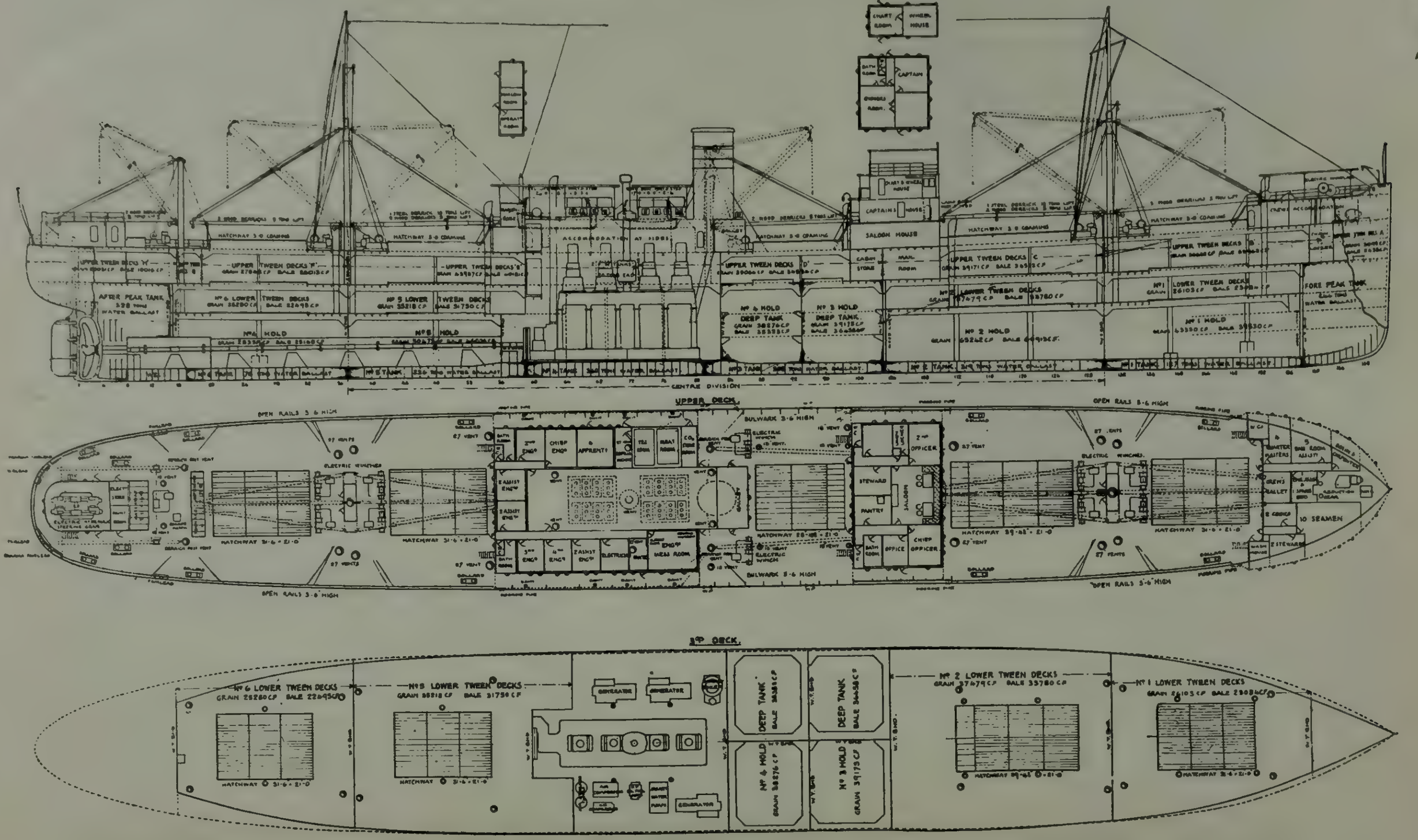
The St. Stephen made seven passages around Cape Horn to San Francisco from either New York, Philadelphia, or Liverpool. Her fastest was in 1880, 113 days from Philadelphia. Her slowest passage was 138 days from New York, in 1887. Her average voyage of the seven was 128 days. On her first trip she returned east via Callao. The following four returns from San Francisco were to Liverpool in 101, 106, 106, and 124 days. The seventh trip was to Hull, in 127 days. Her voyage in 1881 was out to San Diego, thence to Liverpool.

In 1886 she was 64 days from San Francisco to Hong Kong, returning to the Golden Gate in 62 days. On the outward passage of this voyage there were in the crew three cowboys who had never seen salt water prior to their arrival at San Francisco a week before. Sailors were scarce at the time and the rest of the St. Stephen's crew were men who had "jumped" the British ship Drumlanrig which had arrived the day before after a long and hard trip from Cardiff. Within 24 hours after their arrival in port these men were dumped on the deck of the St. Stephen, drunk or drugged. The advance money paid the boarding house keepers practically ate up all their wages for the run to Hong Kong.

The voyages noted cover all the deep water work done by the St. Stephen. After her arrival at San Francisco in November 1886 from China she went to Seattle, returning to the Bay City with 2100 tons of coal. Again going North she left Seattle March 31, 1887, with 2169 tons of coal for San Francisco and was let go by the tug Mogul off Cape Flattery at 11 p.m. At 10 a.m. the next day she was seen by the crew of the bark Enoch Talbot with a heavy list as though her cargo had shifted in the terrific storm then prevailing. During an exceptionally heavy squall immediately following, she disappeared, having foundered with all on board, 22 souls, including the wife of Captain Douglas and his three grown daughters. No wreckage is known to have ever been found.

As usual, the claim was made that the ship was overloaded, although on her passage from Liverpool to San Francisco via Cape Horn in 1883, she had on board 1985 tons of coal. As a matter of fact the storm in which she met her fate was one of the worst ever experienced on the Pacific Coast. The El Dorado and North Star also foundered in the same vicinity with the loss of all but two men, while other ships had very close calls.

Highest Powered Single-Screw Motorship Afloat



Inboard profile and deck plans of the Silver Line cargo motorship Silverash, driven by a 4-cylinder Doxford opposed piston diesel engine of 6000 indicated horsepower.

SAN FRANCISCO
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New California-Orient Motorship Service

THE General Steamship Corporation of San Francisco, on the behalf of the Kerr Steamship Company of New York, are announcing the establishment of a new regular monthly service between the ports of San Francisco and Los Angeles and the ports of Japan, China, Philippines, Dutch East Indies, and the Straits Settlements. This service is to be known as the Kerr Line and will be inaugurated on January 3, 1927 at Los Angeles and on January 10, 1927 at San Francisco, with the sailing of the modern motorship Silverlarch. Sailings will follow at regular monthly intervals with the motorships Silverpine, Silverfir, Silverelm and Silveray.

Motorship Silverlarch of the Kerr Line.

These vessels will be routed from San Francisco direct to Kobe, Shanghai, Hong Kong, Manila, Seorabaya, Samarang, Batavia, Belawan Deli, Singapore. It is expected that delivery of cargo at the first Javanese port will be made in approximately forty to forty-five days from San Francisco, and enabling shippers to get quick service to Dutch East Indies ports, eliminating transshipment at Hong Kong or Singapore. The return voyage will be made via Java and the Philippines to San Francisco and Los Angeles.

This new line is part of the development of a round-the-world service which was inaugurated some time ago by the British motorships named above. This round-the-world service is to be continued with larger and faster motorships, and the ships now on that service are to be diverted to the new Kerr Line.

The ships named have the following general characteristics:

Length over all	375′ 0″
Beam molded	52′ 6″
Mean loaded draft	25′ 1⅛″
Displacement, tons	11,015
Gross registered tonnage	4350.83
Net registered tonnage	2637.50

With the exception of the Silverlarch and Silverpine, which are powered by Neptune 2-cycle diesel engines, all of these ships are powered by Doxford opposed-piston diesel engines. All of the ships have been giving an excellent account of themselves in round-the-world service and are making an excellent record for reliability and for meeting schedule with great regularity.

The first of the larger motorships now to be used in the round-the-world service was delivered to her owners in England about the first of October. She is the first of six sister ships building in British yards for this service, all of which will be delivered before the spring of 1927.

These motorships have been creating a great deal of interest among marine engineers on account of the fact that they are the highest powered, single screw motorships yet built, and also that their engines deliver the largest cylinder output of any marine diesel motors yet built. These engines are of the Doxford opposed piston type with four cylinders, each 26¾ inches in diameter and with a combined piston stroke of 107 inches. On trials these motors developed above 6000 indicated horsepower at 93 revolutions a minute.

The principal characteristics of the vessels driven by these engines are:

Length between perpendiculars	425′ 0″
Beam molded	58′ 3½″
Depth	29′ 0″
Deadweight capacity, tons	9000
Cubic capacity for grain	404,590
Cubic bale capacity	460,401

The power plant is designed to drive this hull at a maximum speed of 14½ knots and to maintain at least 13 knots speed fully loaded.

The drawings reproduced herewith show the general arrangements of these splendid new motor cargo vessels. A large electric plant is installed on these ships comprising three diesel driven generators each of 100 kilowatts capacity. Everything in the way of auxiliary machinery is driven electrically, including eleven electric cargo winches. One of the interesting items in the engine room equipment is the installation of two Sharples super centrifuges of the vapor-tight type, one of which handles the fuel oil for the main engines and the other the lubricating oil.

On all of the vessels, both of the Silver Line round-the-world service and the Kerr Line California-Orient service, adequate provision is made for handling Oriental cargoes. Special arrangements are made in the tween deck spaces to take care of package freight, and the deep tanks are subdivided longitudinally and fitted for taking care of vegetable oils in bulk. These tanks are fitted with steam heating coils to prepare such liquid cargo for handling in cold weather.

The General Steamship Corporation of San Francisco are the Pacific Coast agents and brokers for the Kerr Line California-Orient service, as well as for the California business of the Silver Line round-the-world service.

New Radio Record

ALL daylight radio records between ship and shore were shattered recently when the beach station of the Federal Telegraph Company at San Francisco communicated direct with the steamship President Wilson of the Dollar Steamship Company, a distance of 3120 miles west of San Francisco. The best previous daylight record was about 2400 miles. The President Wilson is equipped with a Federal arc transmitter, and is in charge of Chief Operator S. F. Todd. Ray Farrell was at the key at the beach station. The President Cleveland, 800 miles west of Honolulu, also called the beach station and was also worked by Mr. Farrell.

Editorial Correspondence

The Passing of a Once Famous Ship

IT has been announced that the bark Star of Chile has been sold by the Alaska Packers Association to the Atlas Lime & Plaster Company of Seattle and that she is to be converted into a barge.

The Star of Chile was an iron ship built by Gourlay at Dundee and was launched in October 1868 under the name La Escocesa (The Scotch Lady). She was a handsome little vessel of 969 tons, under deck, but generally loaded between 1490 and 1500 tons of wheat on voyages from the Pacific Coast to England. Her owners were Balfour, Williamson & Co. of Liverpool. A handsome oil painting of her under full sail adorned the offices of Balfour, Guthrie & Co., the San Francisco branch of the firm. Captain D. Evans was her commander for many years.

In January 1871 La Escocesa arrived at San Francisco from Manila via Shanghai, which port she had been obliged to put into having nothing standing above her lower masts as the result of an encounter with a typhoon when 17 days at sea. After repairing, she made the run from Shanghai to San Francisco in 45 days, thence going to Queenstown in 124 days. The ship Benmore reached Liverpool the same day after a run of 113 days from the Golden Gate. La Escocesa returned to San Francisco in 131 days from Liverpool, her passage equalling that of the famous clipper ship Young America which reached port two days later from New York. This creditable performance on the part of La Escocesa caused some comment and, as both ships were to load for Liverpool, considerable interest was taken in the result of their passages. The Scotch Lady made the run in 122 days; the Young America was 105 days; and Glory of the Seas, 112 days.

La Escocesa left Liverpool October 7, 1872, and arrived at San Francisco in 116 days, only to find that Young America which had sailed 6 days after her, had passed through the Golden Gate 11 days before her, in 99 days from Liverpool, 96 days from pilot off Tuskar. Both ships had made some very fast runs at intervals during the voyage, having practically the same time to the equator crossing in the Pacific, and the backers of La Escocesa were more than satisfied that she could actually beat the larger Yankee.

Both ships were again to load back to England and many bets were made on this, which was to be an actual race. The two ships left San Francisco on the afternoon of February 27, 1873, being accompanied to the heads by a tugboat crowded with friends. The Young America reached Liverpool June 14th after a passage of 106 days, while her rival did not arrive at Cork until 13 days later. It was stated at the time that fully $20,000 changed hands in San Francisco and as much more in England, Captain Evans of La Escocesa being included in the losers.

The La Escocesa was then loaded for Callao but before leaving Liverpool was sunk in the river Mersey. She was however subsequently floated and continued in trade principally with the West Coast of South America, making passages to San Francisco. In 1881 she reached that port in 118 days from Calcutta.

About 1902 the Escocesa, then known as the bark Coalinga, was sold to the Alaska Packers Association of San Francisco, and became part of the fleet operated by that company in the Alaska salmon packing industry. Subsequently, in connection with the plan of the company to have all their sailing vessels named "Stars," of which they had a few originals, the name Coalinga was changed to Star of Chile. She has been laid up at San Francisco since her arrival from Bristol Bay in September 1922.

F. C. MATTHEWS
(San Francisco.)

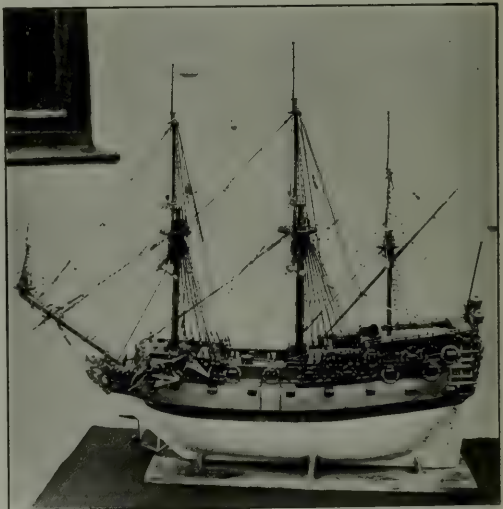
Oakland's Tube Creates Interest

I NOTICE with much interest that the channel between Oakland and Alameda is to be crossed by concrete tubes accommodating vehicular traffic.

I recall that about thirty years ago Sir Edward Reed, then member of Parliament for Cardiff and former chief constructor of the British Navy, also founder of the Institute of Naval Architects of London, patented a scheme for sinking similar tubes in the British channel, in order to connect France and England by rail. A tunnel which had previously been considered was rejected by Parliament, for the reason that it was feared that if the English end of the tunnel got into the hands of an enemy that enemy could pour an unlimited number of troops out of the English end of it. Sir Edward Reed's argument was that these tubes at the ends would be above the surface of the channel and could easily be destroyed by gunfire from British vessels, so long as England had the command of the sea, which was taken for granted at the time.

It is extremely interesting to note that this scheme of Sir Edward's is now about to be carried out in California.

Yours very truly,
A. C. HOLZAPFEL,
(New York.)



Model of a 40-gun British frigate of the year 1700 built during his spare time by Sidney B. Morfee, third officer of the White Star liner Arabic. This model, accurately built to scale, by reference to original builder's plans and to a famous model of the frigate St. George, is a masterpiece of model craftsmanship.

Standard Sailing Boats

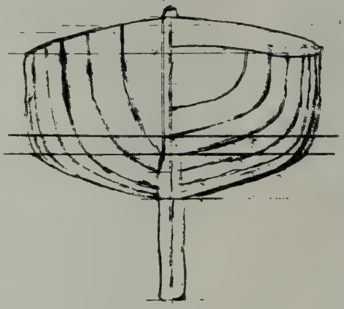
The San Francisco Yacht Club Committee on Design Presents Several Standard Types for Use on San Francisco Bay

By C. J. Rhodin

THE San Francisco Yacht Club, anticipating a large influx of new members with the development of their property at Belvedere Cove, and realizing that many of these new members will want boats of the smaller sizes, have faced the condition that there are very few available models suitable for the rough conditions on San Francisco Bay, which demand a very able and seaworthy boat. The standard 18-foot Cub class, of which the club had quite a fleet, proved inadequate to meet these conditions and have been sold.

To solve this problem the club has appointed a committee on design, Carl Rhodin, chairman, and George Keesling and M. LaViolette. They are to be congratulated on this choice. Rhodin has sailed, built, and raced yachts since childhood on the stormy west coast of Sweden, the Viken country, whence came in past days the Vikings.

This committee has gone to work in a systematic way using their past experience with successful models. Keesling and LaViolette have sailed small boats a great deal and Rhodin had his hand in laying out the famous Yankee which was conceived on a river cruise back in 1905. Then he acted on the committee for design that built the Francesca. He later laid out the little Helen, 21 feet by 6 feet, which successfully sailed the channel course in the Exposition races in 1915 and won several cups.


Amidship section and transverse lines of Belvedere Scout A type.

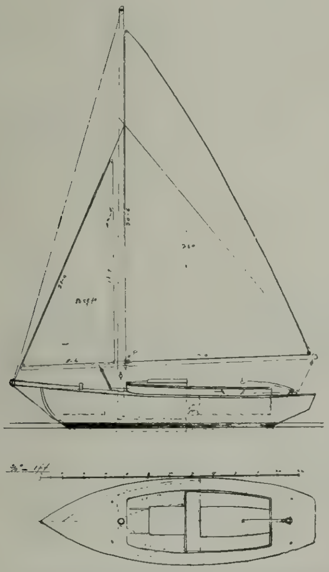
The committee recognizes the successful one design classes already in commission; namely, the Bird Class, 30 feet by 8 feet, costing about $2000, and the Star Class, 22 feet by 6 feet, costing about $900. The latter, while a very happy choice in sheltered waters, is hardly safe for San Francisco Bay.

After considerable study, preliminary bids are being asked for boats as follows:

1. 25-foot seagoing sloop (Belvedere Scout A.) This model typified by the San Francisco Yacht Club's yacht Chance, designed by Alden of Malabar fame. A somewhat modified model is being developed. Preliminary bids indicate this boat can be delivered for $1300. It can go anywhere, the Chance has made trips to Monterey and Santa Cruz and continues to make them right along. Cabin accommodations for 2 to 3 men. Can be fitted with a one-cylinder engine.

2. 20-foot sloop (Belvedere Scout B). This model is a development of the Helen with somewhat more beam and freeboard, essentials for a rough water boat. It will have a large, self-bailing cockpit about 9 feet by 6 feet and a small cabin where in a pinch two young sailors can camp over night. This boat will cost about $800. Outboard motor can be used.

3. 15-foot day boat (Belvedere Canoe). This is a combined rowing and sailing centerboard dinghy to take the place of the Cubs. It will have watertight bulkheads at both ends; will carry a leg of mutton sail, will be absolutely safe, and will provide a very attractive boat for an afternoon around Belvedere or Sausalito for 2 or 3 grown persons. Can be fitted for outboard motor. Cost about $400.

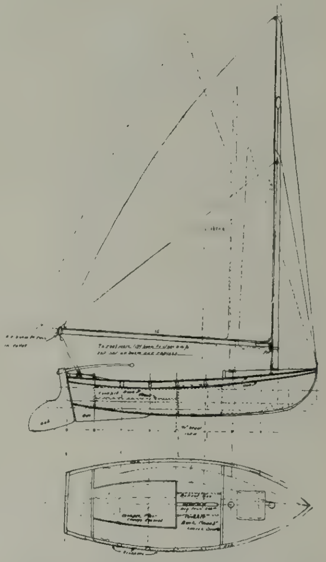

Outboard profile, sail plan, and deck arrangements of the Belvedere Scout A type seagoing sloop.

This latter boat is a development of the lines used for the yawl boat of the schooner Caprice, a remarkably smart staunch little boat that, although only 13 feet long, used to carry the whole crew of six with suitcases, siphons, ice, grub, etc., back and forth from the famous ship.

4. 14-foot skipjack. Last but not least we must have a training ship for the coming crews, small enough so boys can handle her, big enough for one grown leader and two pupils; she must be absolutely safe and not cost much. For this purpose, we are getting out a small, smart centerboard Star, watertight bulkheads at each end and leg of mutton sail. This boat will cost about $175 and should be built in large numbers. It will be safe and able and provide endless joy to the youngsters, and even the "old tars" might leave their rocking chairs and enjoy a turn in these little ships.

Conclusion

With the above four classes established, the bane of yachting, the inability to get a small standard boat at reasonable price promptly, should be eliminated. Builders will be in a position to make up stock boats in slack time and have them ready for sale on demand, and, above all, the boats are Safe, Smart, Seaworthy, the three "S" essentials.


Outboard profile, alternate sail plans, and deck arrangement of the Belvedere canoe type 15-foot day boat.

The Navy and the Merchant Marine

ON Navy Day, October 27, 1926, at Philadelphia, Laurence R. Wilder, president of the American Brown Boveri Electric Corporation, delivered a very eloquent and masterly address on the subject, The United States Navy as an Industrial Asset.

In the first part of his address, Mr. Wilder directs attention to the notable work of the United States Navy and its various bureaus or departments in helping along the industrial and mercantile prosperity of America. This phase of the subject is treated in a number of divisions, such as protection afforded by the Navy to commerce, the initiation of trade made by the Navy through diplomacy, the work of the Naval Observatory, the publication of nautical almanacs, the inspection of navigational instruments, the furnishing and transmission of time signals, and in many other ways.

Other paragraphs call attention to the work of the Hydrographic Office in the preparation of charts; to the work of the Bureau of Ordnance in developing heavy machinery; to the work of the Communications Service in the development of radio; and to that of the Bureau of Aeronautics in the design, construction, and operation of air craft. The aggregate effect of the impressions on industry made in these various directions by the Navy is almost incalculable, and yet the total expenditure for the Navy in 1926, including all of these departments and the upkeep, operation, and replacement of ships, was only $292,000,000. Contrast this with our volume of foreign trade for the same year, totaling $9,250,000,000.

Mr. Wilder then goes on to show that, inestimable as is our Navy as an industrial asset, "of equal importance, both for national prosperity and for national security, is that second element in sea power — an adequate merchant marine flying the American flag." In pointing out how time and again in history the policy of depending upon foreign shipbuilding has proved shortsighted, costly, and embarrassing, and how we are becoming as a nation continuously more dependent, Mr. Wilder shows that at the present writing "6 per cent of the fifty million citizens listed as gainfully employed depend for their livelihood upon our foreign markets." He brings out also very vividly the fact that while Great Britain has approximately 65,000 men as available naval reserve and Japan nearly 40,000, the United States has less than 25,000; and that also though the United States "ranks second in the world in merchant tonnage, we are actually outnumbered six to one in fast liners."

Recommending the building of various types of naval tonnage so as to bring our Navy up to the full standard as specified in the Treaty for the Limitation of Naval Armaments and calling attention to the fact that the treaty places no limitation on the building of vessels less than 10,000 tons, notwithstanding which fact not one new destroyer has been added to our Navy in the past six years—Mr. Wilder goes on to suggest an adequate program of merchant marine expansion in the following words:

In the sea power of any maritime nation there are three elements—its navy, its naval bases, and its merchant marine. By the terms of the Washington agreement, the first two elements in American sea power are somewhat restricted. But the third and remaining element—a merchant marine which is primarily a commercial factor—is open to the widest exploitation.

When the world war began in 1914, we had a very limited number of merchant ships. How America created a great fleet of merchant vessels to meet the emergency is familiar history. In an almost incredibly short period, our merchant shipping industry grew from practically nothing to one of gigantic proportions. Since the close of the war we have had on our hands this immense fleet, built at a total cost of some three and a half billion dollars; a considerable portion of the tonnage has been scrapped, but many millions more have been spent in operating some of these emergency vessels. The production of this vast tonnage was distinctly a war measure. It was a good fleet. It served its purpose, but the work for which it was created was performed long ago. Most of the ships produced during that emergency period are wholly unsuitable for competitive purposes in present day commerce. Furthermore, whether idle or in operation, they have been a constant source of expense to the government. The relatively higher cost of building and operating American ships, as compared with foreign vessels, is in itself a serious handicap. We should not increase that handicap by attempting to run ships which are unfit to meet modern competition.

Personally, I believe that all of our obsolete government tonnage should be scrapped. A comprehensive program should be adopted without further delay for building merchant vessels designed to meet competition in all the various trade routes. Special attention should be given to the production of larger and faster vessels which in times of emergency could quickly be converted into cruisers. Every effort should be made to stimulate the activities of our shipyards which must always be considered an important national asset. All government shipbuilding and repairing should be given to private shipyards, in order to keep the skilled technical staff together and available, not only for an emergency such as war, but to preserve the independence of the United States in one of our most vital industries. This, in itself, would be one of the best kinds of government aid to American shipbuilding.

The Merchant Marine Act of 1920 definitely declares it to be the policy of the United States "to do whatever may be necessary to develop and encourage the maintenance" of a merchant marine "of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States."

At the last session of Congress, the Senate passed a resolution requesting the Shipping Board to prepare and submit to the Senate not later than January 1, 1927, comprehensive and complete plans for building up and maintaining an adequate merchant marine for commerce and national security. The Shipping Board is actively engaged on this task and is now holding public hearings to get the views of all concerned. All of this is indeed encouraging.

The United States Navy is ready to cooperate to the fullest extent in creating an adequate merchant marine. American shipyards can produce all the ships required, equal in every respect to those of any nation. With deserving and helpful aid they will be able to compete successfully and help to perpetuate this indispensable American industry.

Growth of Inland Waterways Transportation in the United States

The Mississippi-Warrior Service

Colonel Thomas B. Esty

A VERY useful outgrowth of war-time activities of the federal government is the Inland Waterways Corporation. This corporation was formed by an Act of June 3, 1924 for the purpose of taking over the Mississippi and Warrior River services then operated by a federal manager located at New Orleans as a hold-over from the service inaugurated on those rivers during the war. In the Inland Waterways Corporation is embodied the duty of developing, as business and public interest warranted, similar lines of transportation on all navigable rivers.

The Inland Waterways Corporation is a private corporation in the sense that it is suable at law. It also comes under all strictures and regulations of the Interstate Commerce Commission. It is a federal corporation only in the sense that the majority of the stock is owned by the United States Government and that the corporation is governed by the Secretary of War. In the active operation of this corporation, however, there are only two Army officers employed; one, Brigadier-General Thomas Q. Ashburn, U.S.A., who is chairman of the board of directors and executive manager of operations, and, the other, Colonel Thomas B. Esty, Pacific Coast representative of the corporation with offices at the Custom House, San Francisco.

The corporation has been organized by General Ashburn along the lines of a public utility corporation, the personnel being very largely railroad and steamship men of long experience. It is being developed as the first unit of a great inland waterway system. This unit, and the others to be developed, will eventually be sold to private owners of financial responsibility.

The figures for tonnage and for net revenue have shown a very gratifying trend since the Inland Waterways Corporation took charge of the Mississippi and Warrior River Service. In the fiscal year 1923, in round numbers, 979,000 tons of freight were handled, giving a total revenue of $2,800,000, with a total expenditure, including depreciation, of $3,800,000, or an operating deficit of $1,000,000. This handicap has been gradually overcome and the tonnage has increased. until during the fiscal year ending June 1926 1,350,000 tons were carried, with a total revenue of $5,130,000 and a total expenditure, including depreciation, of $4,780,000, or an operating profit of $347,000 after absorbing a depreciation charge of $1,490,000.

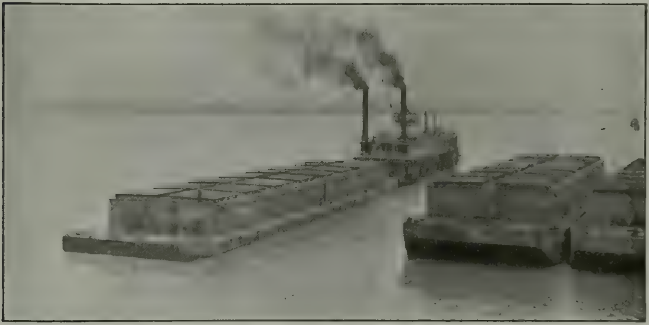
It will be noted that there is a very gratifying increase in the average revenue per ton, amounting, in the three years, to an increase of 89 cents per ton. This increase in average revenue per ton is due to carrying larger quantities of packet freight, greater public opportunities for using the service, and also better cooperation from and with railroads, allowing of a better division of revenue accruing from rail-water hauls. There is also a decrease of the expense of maintenance and operation per ton. During the three-year period under review, this decrease on the Mississippi amounted to 26 cents per ton and on the Warrior to 87 cents per ton.

These figures certainly reflect very economical and efficient management. Overhead expense also shows a decrease of 2 cents per ton in both services, and the aggregate result is an increase in the total net income on the Mississippi Service of $1.15 per ton in 1926 as compared with 1923, by changing a loss of 49 cents per ton in 1923 to a profit of 66 cents per ton in 1926.

The Mississippi-Warrior Service maintains weekly sailings of the packet boat service for merchandise; freight leaving St. Louis every Friday, delivering and picking up freight at Cairo on Saturday, Memphis on Sunday, Vicksburg on Tuesday, and New Orleans on Thursday.

For bulk and slowfreight a towboat of the tunnel type and a group of steel cargo barges leave St. Louis every six days for New Orleans and intermediate points. This service enables shipments originating at the points named on the Mississippi to demand an all-water rate to any port in the world, and gives joint water and rail rates from St. Louis or from New Orleans to interior points in Montana, Alabama, Arkansas, Tennessee, Mississippi, Oklahoma, Louisiana, and Texas. The Warrior Service taps the large freight producing sections around Birmingham, Alabama.

Very profitable connection with the Inland Waterways Corporation service has been maintained for some time between Pacific Coast and Gulf ports by the Luckenbach Steamship Line and the Gulf-Pacific Line (Swayne & Hoyt), and an increasing number of intercoastal steamers are venturing into this service.



Towboat Wynoka of the Mississippi-Warrior Service arriving at St. Louis.

Converting a Ferryboat

600-Horsepower Washington-Estep Diesel Engine to be Installed in Steam Ferry Golden City

THE Golden Gate Ferry Company of San Francisco pioneered the first use of the modern diesel-electric drive for ferryboats. This company is so thoroughly impressed with the operating economies obtained by the use of the diesel engine as a prime mover that they are now proceeding on an intelligent program of dieselizing their steam fleet.

The Golden City, formerly the Alven J. Hanford, is a wooden steam, screw double-ended ferryboat built in 1920 by James Robertson's Shipyard at Alameda, California. She is now laid up at the San Francisco yard of the ferry company being stripped of her steam plant preparatory to the installation of a Washington-Estep diesel engine.

This boat has the following dimensions:

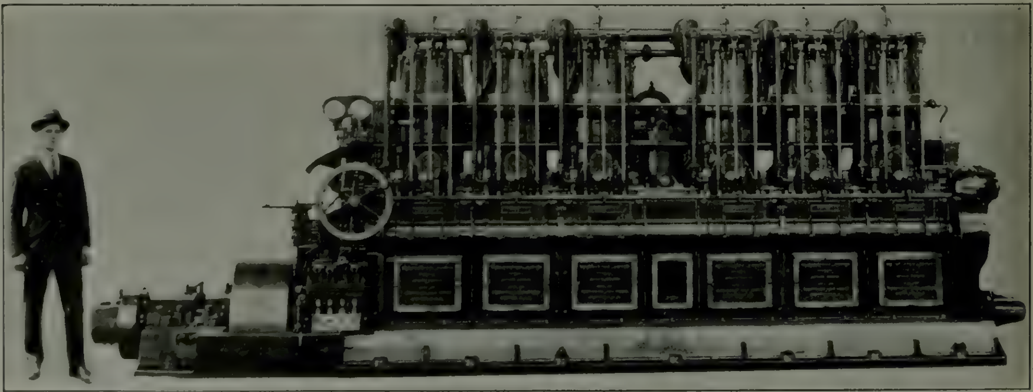
Length	176.8 feet
Beam, molded	30.5 feet
Depth, molded	12.7 feet

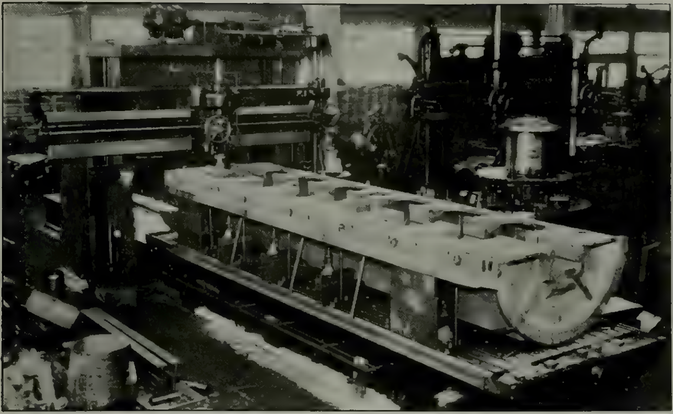
Her power plant consisted of a 4-cylinder, triple expansion, vertical steam engine 20 by 29 by 30 by 30-inch cylinder diameters and 18-inch stroke. This engine was one of a pair taken from the United States destroyer Farragut and was a very light skeleton engine of exquisite workmanship and composed, in many of its parts, of high grade alloy steel forgings. As installed in the ferry, this engine was set as low as practicable and connected rigidly by line shafts to the propellers at each end of the hull. In the destroyer, each of the engines working at 240 pounds pressure and at 427 revolutions a minute developed approximately 3000 indicated horsepower. In the ferryboat the same engine cut down to 140 revolutions a minute and at 195 pounds boiler pressure was producing 500 indicated horsepower. The propellers are 7 feet in diameter and 10-foot pitch, and with the steam plant they drove the hull at a little better than 12 knots an hour on a fuel consumption of 4.5 barrels of fuel oil an hour, including idle time in slip at ends of runs.

The Golden Gate Ferry Company's steam vehicular ferry Golden City.

Conversion of this ferry was greatly complicated by the very small clearance existing between the ship's timbers and the line shaft. Any alteration to shaft log or keel timbers was inadvisable and was prohibited by specifications. To meet this condition, the engineering staff of the Washington Iron Works proposed mounting their 600-horsepower engine on a special sub-base which would raise the center line of the crank shaft 18½ inches above the center of the line shaft to the propellers. This sub-base served to house a clutch and a set of herringbone gears at each end of the engine. With this arrangement the engine would run at 200 revolutions a minute, its standard rated speed, and the propeller shaft would be driven at 145 revolutions.

The clutches are to be of the cone type and will be used to release the forward shafting and propeller, allowing the power of the engine to be concentrated efficiently on the after screw, while that at the forward end idles. This makes a very flexible arrangement and is susceptible of arrangement for pilot house control, which will later be installed on the Golden City.


A 6-cylinder Washington-Estep diesel engine of the type to be installed in the ferryboat Golden City; A. C. Estep, designer of this diesel, at left.



The Washington-Estep diesel engine to be installed is said to be the largest powered marine diesel unit operating on San Francisco Bay ferry service. It has six cylinders, 17-inch diameter by 24-inch stroke, and develops 600 brake horsepower at 200 revolutions a minute. The unit as installed will have an overall length of 38 feet, a height of 11 feet 5 inches from center line of propeller shaft to top of fuel valves, and will weigh approximately 80 tons.

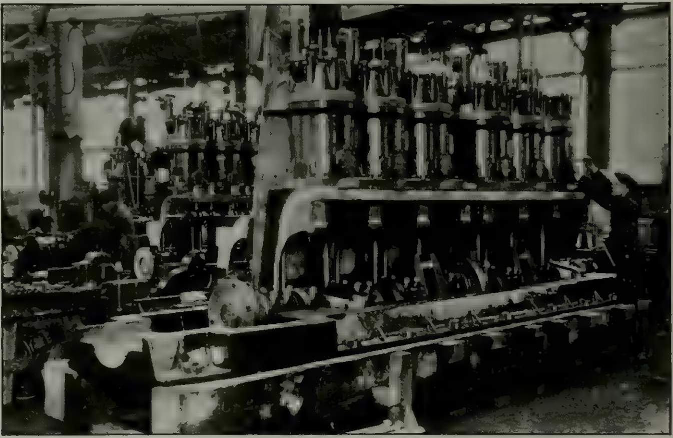
All steam apparatus and auxiliaries are being removed and will be replaced by modern diesel machinery. The steering gear will be changed to operate with air and the entire craft entirely overhauled befor going back into service. The work is being done under the personal direction of H. E. Speas, vice-president and general manager of the Golden Gate Ferry Company, assisted by C. C. Brown, chief engineer.

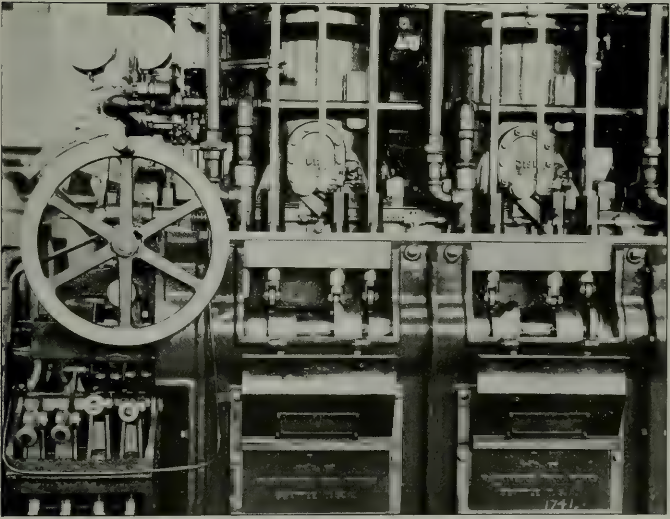
It is interesting to note that the fuel consumption will be reduced to about one-eighth of the quantity used by the former steam plant.

The operation of this installation will be watched with great care by many Pacific Coast shipowners interested in the possibilities for operating economy offered by conversion to diesel drive, and the Washington Estep engineers keenly realizing this fact are giving very careful attention to the design and construction and shop trials of this unit. After thorough test the engine will be shipped to San Francisco and disassembled for installation.

THE WASHINGTON-ESTEP DIESEL

On this page we exhibit three views taken in the shops of the Washington Iron Works, Seattle, showing the type of work being done there. Above is shown the bedplate and crankcase casting for the 600-horsepower 6-cylinder engine for the ferryboat Golden City being machined by the big Ingersoll slab miller. This machine is the largest of its type west of the Mississippi River. At the right is shown a 6-cylinder Washington-Estep on the erecting floor. Note the arch construction of the frame supporting cylinders and the easy access to crank shaft and bearing. Below is close-up of one end of the cam shaft and the control mechanism. Note the workmanship and the long bearing surface of the guides for the push rods.





New York Adopts Diesel-Electric Drive

American Brown Boveri Electric Corporation Building Six Steel Vehicular Ferries to Operate Between New Jersey and New York City

THE diesel-electric system of propulsion for ferryboats, which has come to be practically the standard power for this type of vessel on San Francisco Bay, is now to be given a thorough trial on New York harbor. The Electric Ferries, Inc. now have building at the Camden, New Jersey, shipyard of the American Brown Boveri Electric Corporation six steel double-end, double-screw diesel-engined, electrically driven ferryboats for carrying automobiles from the terminals of the Erie Railroad in New Jersey to Twenty-Third Street, New York City.

The first two of these vessels were launched practically complete on October 21st and were christened Governor Moore and Charles W. Culkin. Keels for all of these vessels were laid on June 5 and all of the boats are being practically completed on the ways. The two boats launched were so complete that dock trials were run on the day following the launching and it is now assured that all deliveries will be made to the owners on the date called for in the contract.

The operation of these vessels—the first diesel-electric ferries on the Atlantic Coast—will be an innovation in New York harbor transportation, for with this new service the old time steam driven ferries will have a distinctly modern and interesting competition. The boats have been especially designed by Eads Johnson, Inc., of New York, for motor car traffic, and will be operated exclusively for motor vehicles. Each boat is approximately 155 feet long over-all, with a length on the water line of 153 feet, a beam over the guards of 48 feet 6 inches, depth of hull 14 feet 3 inches, and a loaded draft of 9 feet. Five lanes of cars will be carried on the main deck, accommodating a total of 46 average size automobiles. The large center lane is adequately designed for the accommodation of very large trucks and passenger busses. The gross tonnage of one of these ferries is approximately 405 tons, as against some 1200 tons for a steam ferryboat of like capacity. It is estimated by the designers that each of these diesel-electric ferries can be operated at a saving of $40,000 to $50,000 a year, as compared with a steam driven ferry of like capacity.

The Ward Leonard system of pilot house control will be used. This system provides a variable voltage control and places the speed and direction of the propulsion motor under direct control of the pilot on the bridge. This equipment for each boat consists of three master controllers with full reverse, giving approximately 19 speeds in each direction. Two of the master controllers are installed, one in each pilot house, and the third in the engine room. Suitable interlocking and transfer switches are provided.

The power plant of these ferries consists of two Nelseco diesel engines each driving a direct current generator and exciter on a common shaft. Each engine, with its generator and exciter, is mounted complete as one unit on the ship's structure and furnishes power for the single direct current propulsion motor. The diesel engines are of the 6-cylinder, 4-cycle, single-acting type, designed to develop 350 brake horsepower each at 280 revolutions per minute. The bore and stroke are 12¼ inches and 18 inches, which gives a piston displacement of about 12,636 cubic inches. The generators are shunt wound open type of 240 kilowatts at 250 volts and 280 revolutions per minute. The exciters are compound wound, having a capacity of 35 kilowatts at 125 volts. The current from the two generator units passes to the single direct current motor driving the through propeller shaft which carries a 3-blade 7-foot propeller at each end. This motor is of the shunt wound, eight-pole, double armature type rates at 580 horsepower at 250 volts and 180 revolutions per minute. All motors and generators were built by the American Brown Boveri Electric Corporation in conjunction with the Electro-Dynamic Company.

The auxiliary equipment consists of one Hill diesel generating, compressing, and pumping unit for miscellaneous service, and one Ingersoll-Rand motor driven compressor for use in starting. When the main engines are running the lighting circuit receives power from the main exciters and at other times this energy is furnished from the Hill diesel set.

Both motor-driven and hand-steering gears have been furnished by the American Engineering Company.

The Erie Railroad Company now has a special agreement with the largest trucking companies in New York City for direct store door delivery by truck from their Jersey City Yards. The Erie's yards at Weehawken are, in the opinion of experts, unexcelled in location for the unloading of a great number of freight cars directly into trucks and are immediately adjacent to the ferry slips, practically guaranteeing all truck delivery from these yards over the Electric Ferries, Inc., lines to Manhattan.

More than 12,500,000 vehicles were carried by the Hudson River ferries in 1925, and the annual increase in traffic has averaged over 970,000 vehicles per year for the last five years.

Additional Protection for United States Government Vessels

Contracts have been awarded the Federal Telegraph Company for equipping two additional government vessels with Kolster Radio Compasses. These are the U. S. Army transport Meigs, and the U. S. Coast and Geodetic Survey ship Guide.

The Guide will use this equipment in special coast survey work as well as for navigational purposes. This is a new and interesting use for the Kolster radio compass and the Guide will be the first ship to take advantage of the possibilities in this field. The results will be watched with great interest by many scientists and technical men of note.

The installation on the Guide will be personally supervised by Dr. Frederick A. Kolster, chief research engineer of the Federal Telegraph Company who is the inventor of the radio compass.

Solid Injection Combustion Methods For Diesel Engines, II

By C. E. Klitgaard

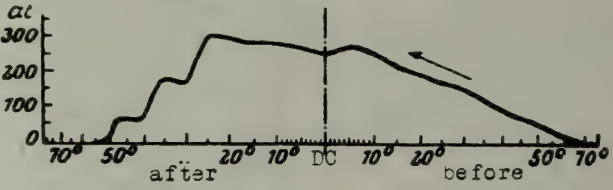


Fig. 6.

THE amount of fuel pressure used has a considerable influence upon the rate of combustion and the shape of the diagrams. Adjustment of fuel pressure was made by tightening the spring of the fuel needle and checked by regulating the fuel valve by means of a hand pump provided with a pressure gauge; and for recording of the oil pressures in the fuel valve, a specially designed indicator was used.

Determining the Fuel Pressure

Fig. 6 shows a hand made diagram taken by this indicator, the diagram being so made because the events outlined are taking place near the ignition dead center; though the connecting of the indicator somewhat influences the hydraulic events, this influence was so checked as to be negligible, inasmuch as it decreases directly as the ratio between the total capacity of the pressure pipe line including fittings and the size of the small indicator cylinder.

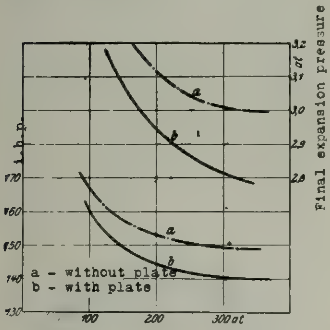


Fig. 7.

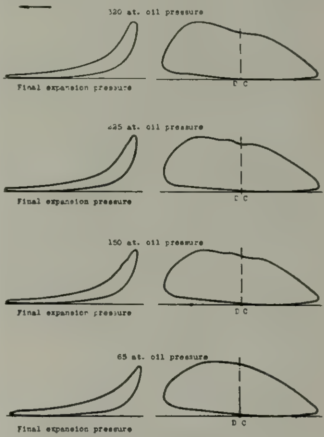
Fig. 7 shows to what extent, under full load, the fuel consumption and final expansion pressures depend upon the injection pressure, everything else being equal. Under most former experiments of this nature the oil pressure was kept constant while the ignition pressure was allowed to vary, but in this case the ignition was kept constant by adjusting the pump cam while the oil pressure varied. Fig. 7 shows clearly that the combustion improves with a rising oil pressure but that over 300 ats. (about 4260 lbs. per sq. in.) there is practically nothing to be gained. There are virtually no points in the fuel consumption curve differing essentially from curves published heretofore covering experiments with motors having hemispherical combustion chambers.

The improvement of combustion noticeable with increased oil pressure should probably be ascribed to the penetrating force of the fuel oil jet increasing directly with the pressure, and also to the improved atomizing and distribution of fuel due to this increased pressure. Experiments carried out with nozzles which had been used in the present experiment, for the purpose of determining this point, show very distinctly that practically no atomizing actually takes place up to and before an injection pressure equal to about 100 ats. (about 1420 lbs. per sq. in.) the jets leaving the nozzles practically as solid streams, transparent, and having the same color as the oil used.

No experiments were made with nozzles of other construction and design to determine if they could produce effective atomization within this pressure range.

Under a higher pressure of from 150 to 300 ats. the jets are wide and are dissolved from the very beginning into minute drops; if they hit the mushrooms the spraying effect is continued, the drops becoming still more minute. It is of course questionable whether the results observed by the injections of oil into ordinary air are the same as when injected into the combustion chamber, which contains air having from fourteen to fifteen times higher density, in general, however the assumption might be accepted as representative of such conditions.

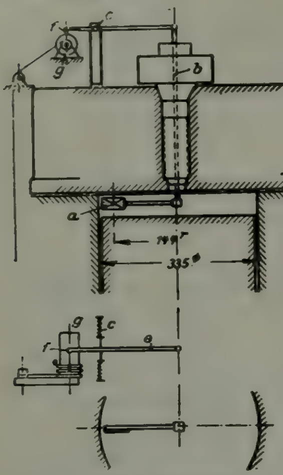
The diagrams shown in Figs. 8 to 15 indicate how the combustion is influenced by the different injection pressures. The diagrams of Figs. 8 and 9, taken at 320 ats. (about 4550 lbs. per sq. in.) injection pressure, represent the maximum combustion; and Figs. 14 and 15, taken at 65 ats. (about 925 lbs. per sq. in.) injection pressure, the minimum; these deductions being confirmed by the considerable amount of post-burning and the very high final expansion pressure shown in these latter cards. There is, however, another factor besides pressure involved in the inferior combustion taking place at 65 ats.; at this low pressure the injection period is necessarily much longer than that of the highest pressure, consequently the oil jets overlap the edge of the mushrooms during the last phases of the injection period, striking the edge of the piston head and the cylinder liner, which naturally influences the combustion very unfavorably and produces smoke.



Figs. 8 to 15 inclusive.

Artificial Air Whirls

By means of the arrangements



Figs. 16 to 18 inclusive.

described above, namely, flat combustion chamber, specially formed piston heads with mushroom, and choice of the most efficient injection pressures, it was possible to reduce fuel consumption of the test motors to 149.4 grams per indicated horsepower per hour. Finally a very efficient means for improving the combustion in the flat combustion chamber was used by artificially rotating the air in the cylinder around the cylinder axis.

This was done by means of a plate fastened to the intake valve, the arrangement being made in such a way that the intake suction could be covered gradually by a plate and that the intake direction could be controlled while the engine was running. Due to contradictory statements in former publications, there was some doubt as to whether the rotation of the air produced by the plate in the suction stroke would continue to the close of the compression stroke and during combustion. The first experiment with a plate fixed to the intake valve demonstrated a strong influence of the air improvement upon the combustion; in turning the intake valve slowly around its axis the exhaust was considerably improved in four positions, compared to the motor operated without the intake plate but was much less satisfactory in two positions.

As no explanation could be found covering this phenomena, we endeavored to measure the force of the air current at different positions of the piston. For this purpose the cylinder was provided with a measuring device shown in Figs. 16 to 18.

The pressure of the rotating air acts upon the small disc (a) supported by the rod (b), which is led through the fuel valve in the center line of the cylinder; on the outside, the rod is connected with a registering pen and two springs (c), which keep the disc in zero position, and the diagrams registered by the pen on a drum give the forces exercised upon the disc (a) by the rotating air currents.

Figs. 19 and 20 show two of these diagrams taken with an electrically operated engine. Fig. 19 is a true indicator card showing the air movements in proportion to the piston movement, while Fig. 20 is a hand drawn card. Both show that the pressure in the suction stroke increases slowly, decreases with the returning piston, again increases slowly during the compression, and finally decreasing suddenly at about 30 degrees after the upper dead center.

From these pressures the corresponding velocities can be calculated by the well known formula based on the density of the cylinder contents varying with the position of the piston, on the pressure exerted on the disc, and on the form resistance factor.

The result of this calculation is a diagram shown on Fig. 21, in which it will be seen that the compressed cylinder air is rotating in the ignition dead center with a speed of about 20 meters per second.

The velocities obtained with the same plate, merely by changing the average intake direction, are shown in Fig. 22. This experiment which we believe is the first of its kind, proves that a rotation of the cylinder air initiated during the suction stroke lasts until the combustion period.

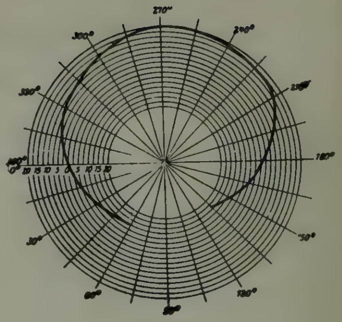


Fig. 22.

Fig. 23 indicates how the fuel consumption per indicated horsepower hour depends on the different intake directions. The concentric dot-and-dash circle represents the consumption without rotating the cylinder air, and as already mentioned this amounted to 149.4 grams per indicated horsepower hour.

It is interesting to note how the consumption curve with air rotation, shown in solid black on Fig. 23, runs partly above and partly below the consumption curve without air rotation. The minimum of consumption, namely, in the average about 140 grams per indicated horsepower hour, is obtained with an intake air direction of 30 degrees, 150 degrees, 195 degrees and 330 degrees; while for 225 degrees intake direction, corresponding to 20 meters per second velocity, the consumption shows 157 grams per indicated horsepower hour. It is obvious therefore that air rotation

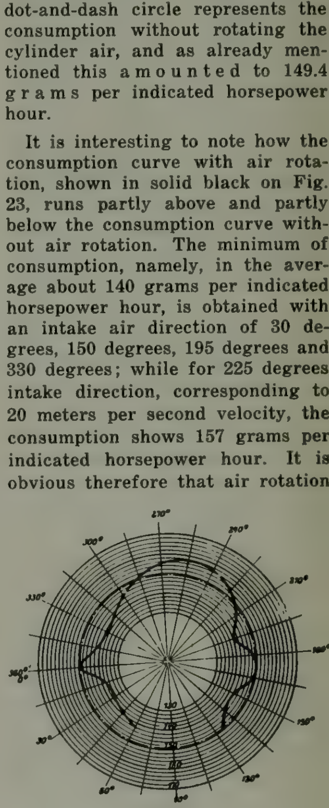


Fig. 23

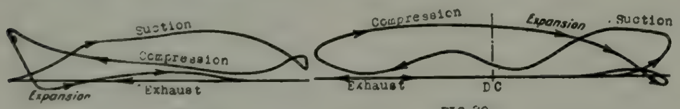


FIG.19.

FIG 20.

Diagram showing movement of air in working cylinder due to installation of deflection plate in air intake valve, taken with measuring device explained in FIGS 16-18.

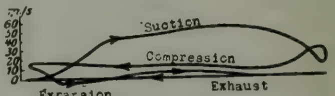
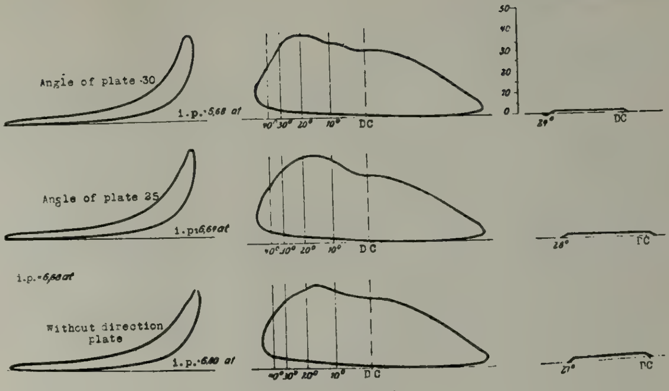


Diagram of circulated air velocities.

FIG 21.



Figs. 24 to 32 inclusive.

does not in every case improve combustion.

The comparison of Figs. 22 and 23 shows that the four low points for consumption correspond to one definite velocity of air, i.e., 8 to 9 meters per second; the question therefore arises as to why the rotation of the air influences the combustion favorably in one case and unfavorably in other cases. With the favorable average velocity of 8½ meters per second, an air particle near the cylinder liner passes over one quarter of the circle; therefore, it seems reasonable to assume that with a considerably higher velocity of the air, the combustion gases of each jet of the four hole nozzle come in contact with one another and thus impair the atomization and combustion of the oil particles during the last phases of the injection period; these latter particles being evaporated because of the lack of oxygen, and are therefore burnt too late, causing poor combustion and consequent increase in fuel consumption. Figs 24 to 32 confirm, in general, this assumption.

Figs. 24 to 26, taken at 30 degrees intake direction, show, by quick decreasing expansion line and low final pressure the best combustion. Figs. 27 to 29 taken at the highest rotating velocity, corresponding to 250 degrees intake direction, show by the slower declining expansion and the higher final pressure, considerable post-burning. Figs. 30 to 32 are taken without rotating the cylinder air and are only very little better with respect to post-burning than Figs. 27 to 29.

Examination of the piston head after tests further evidenced the beneficial effect of air rotation, in that the piston head clearly showed considerable spraying of the fuel taking place, and further showed that each fuel jet of the four hole nozzle covered exactly one quarter of the circle. No such indications were found when the pistons were examined after tests conducted without the use of artificially whirled air in the combustion chamber.

The aforementioned results are based upon an intake direction of 180 degrees obtained by a plate attached to the intake valve; tests with smaller intake angles were carried out on the same motor and it was found that with an angle, for instance, of 90 degrees, the velocities were reduced by a ratio of 2:3. The plate with the small angle gives—for the same intake direction as used for the plate with the large angle—much smaller rotating velocities in the combustion chamber. In order to prove this theory, the small plate must be fitted so that the most efficient intake velocity of about 8½ meters per second will be obtained, if as satisfactory combustion is desired as that obtained with the larger plate. This velocity is obtained at an intake direction of about 90 degrees and 270 degrees; at these intake directions we have actually secured the most efficient fuel consumption, the lowest exhaust temperatures, and the least final pressures of expansion; in fact, with this plate we secured fuel consumptions averaging 138 grams per indicated horsepower hour with a mean effective pressure equal to 6½ ats. (about 93 pounds per square inch); namely, full load. We know of no instance where such low values have ever been obtained even with experimental engines using air injection.

Both motors gave the same favorable results with anthracite-tar oil for fuel, without the necessity of any rearrangement or without the use of special oil for ignition. The corresponding fuel consumption for anthracite-tar oil of 16,200 B.T.U. was 155 grams per indicated horsepower hour, which in consideration of the heating value of ordinary diesel fuel oil (about 18,700 B.T.U.) checks with the oil consumption noted above.

You will note that the fuel consumption mentioned throughout this report refers entirely to the indicated horsepower. The working conditions of even the best motors are subject to many inconstant factors, so that fuel consumptions based upon brake horsepower are not reliable. This is well known in professional circles but, nevertheless, very often neglected. It would be most desirable and certainly much more reliable if consumption of fuel in connection with the operation of diesel motors were based entirely upon the indicated horsepower instead of the brake horsepower.

It is to be borne in mind that the means described in this pamphlet for controlling the combustion will not necessarily always produce the most favorable results with motors of other design or construction, and are therefore for the time being applicable only to motors of the type and design tested. Notwithstanding this fact, it is, nevertheless, our belief the data set forth in this article will greatly assist in clearing up the still unknown factors of the events taking place in the cylinder of a compressorless diesel motor during combustion.

Diesel Economy

THE B. B. McColl, a tanker operating between Buffalo and Toronto through the Welland Canal, was recently converted to diesel drive with two 300-horsepower Nelseco diesels. She retained a donkey boiler and uses steam for steering gear, whistle, and deck winch. She now shows the following remarkable fuel costs for one loaded trip, Buffalo to Toronto:

Fuel for main engines, lights, and cargo pumping-800 gallons at 6 cents, $48.

Fuel for steam for steering gear, whistle, and winch—1100 gallons at 6 cents, $66.

Needless to say the boiler is coming out this winter.

Pacific Workboats and Their Power Plants

Delta Workboat Notes

ONE of the oldest operators of workboats around San Francisco Bay and its tributary rivers is Captain Ben Walters, of Stockton. It is not intended to intimate that he is old in years, for he is not. But since his boyhood he has been identified with transportation by water. For many months he was engaged in the Yukon River trade during the Klondike gold rush, and for several years past he has been head of the Island Transportation Company of Stockton. He has observed the progress of boat propulsion from the old "scow schooner" days through gas and distillate operated engines down to the present diesel motors.

Captain Walters is enthusiastic on the subject of diesels. Some few months ago he had two of his workboats dieselized by the Atlas-Imperial Engine Company. Close accounts of costs and performances show one-fifth less running expenses for fuel and a very considerable increase in the work done. One of the diesel workboats now tows a 500-ton barge load of cargo and gains one and a half hours on a former ten hours' run. This is a big time saving factor and, taken with the lessening of fuel costs, shows the advantage of the diesel engine for this sort of work.

Bundesen & Lauritzen Shipyard and Machine Works at Pittsburg, California, have just completed the work of replacing the former gas engine of the workboat Gwendolyn with a new 55-horsepower Atlas-Imperial diesel. The Standard Oil Company's tug Dispatch has also been overhauled at this yard in addition to general repairs and new jobs. A barge to be used as a tender, for the Dredge and Construction Company of Rio Vista is now on the ways. Several other jobs are in view, and business looks good.

This firm has recently taken control of the Delta Dredging Company, believing this a good adjunct to the ship yard. The yard, formerly operated by Johnson & Lanteri, is doing well under the management of the new firm.

The Fulton Shipyard at Antioch has been quite busy the past several months. The delta tender Stanley Roberts and the City of Napa, in the same trade, have been delivered and are giving good service. Two new workboats, of 55 feet length and 14 feet beam, by 6 feet 6 inches draft, are now under construction. One of these, for the Rio Vista Lighterage Company, will be powered by a Western-Enterprise diesel. Repairs and overhauls of small craft have also been quite a factor in the activities of the yard. F. L. Fulton, manager, says the outlook for further business is good.

Stevens Brothers, of Stockton, who build speed boats and pleasure cruisers to fit the water, report a very good season in this class of work. At present they have seven cruisers, of from 39 to 50 feet length, and nine speedboats of the high power 26 foot type, on the ways. A speed boat of 25 miles ability has just been completed by Stevens Brothers for the Fish and Game Commission.

Colberg Brothers, of Stockton, besides repairs and renewals to their own extensive fleet of workboats and barges, have built and delivered the Service, a delta cargo workboat. Another similar vessel is nearing completion. These craft are of 65 feet length, 25 feet beam, and are to draw 48 inches loaded. Power is supplied by a Fairbanks-Morse full reversible diesel of 120 horsepower. The Service will carry about 200 tons when loaded and will develop a fair speed in the delta waters. They are flat and beamy, with two fore and aft bulkheads to keep them in shape and strengthen the hull.

A DIESEL HYDRAULIC BARGE

THE Delta, a dredge operated by the Delta Dredging Company of Pittsburg, California, is the only one which uses hydraulic power in handling the clam shell bucket, boom, spuds, etc. This dredge has been in operation for several years and was designed by Robert Wilson, a mechanical genius. A Fairbanks-Morse single cylinder diesel engine of 25 horsepower drives a high duty pump, forcing water into an accumulator at a pressure of 250 pounds per inch.

By a system of valves and levers the liquid under this pressure is made to operate pistons with multiplying sheaves, much in the manner of the old type hydraulic elevators.

It is claimed that running costs are much cheaper with this method, as a low powered engine is kept running almost constantly at its most efficient rate, there being no momentary high powers and then waits between lifts. The hydraulic method balances and evenly distributes the power. It is said that less than half the fuel is used in this dredge when working full power than in others where the engines drive the winding gear direct. Very close regulation in lifting and swinging the bucket is also a feature.

The Delta was built by Johnson & Lanteri at Pittsburg some years ago and is still doing fine work. Her operators, Bundesen & Lauritzen, are considering building another similar barge with later improvements.

The fuel oil companies doing business at Stockton, California, with the delta workboats have established stations at the wharves where all kinds of fuel and lubricants can be handily supplied. Besides these stations the companies maintain quite a fleet of river craft that navigate the channels among the delta islands to serve such craft as may not go "up river," and also to supply fuel and lubricants for irrigation pumps and farm machinery, of which a great deal is used in that district.

Thus one sort of workboat keeps others going, for without fuel none could function. In fact the oil carrying workboats play a most important part in the business between Stockton, the Delta, and San Francisco.

Above, J. R. Bundesen. Upper right, View in the Pittsburg yard of Bundesen & Lauritzen, showing work in hand. Lower right, the working force of Bundesen & Lauritzen yard.

James Robertson's Boatyard, which for some years has been located at the foot of Grand Avenue, Alameda, will soon be established on the Estuary just above Park Street bridge. Complete machinery for the building and repairing of all kinds of wooden vessels will be installed. A new dry-dock, 110 feet long and 40 feet beam, is now being built at the old yard and will be moved to the new one. Several new methods of handling vessels will be used in this dock, not the least of which is that the side chambers will be but four feet high, thus allowing ready access to the vessel floated. Craft drawing 12 feet can be docked at low water.

Associated with James Robertson is his son Milton, who takes a keen interest in the art of wooden hull construction and is a designer of ability, having studied with his father for many years.

The new tug A. E. Williams, building by James Robertson at his Alameda yard, will be one of the heaviest and ablest craft of her type out of San Francisco. She is designed as a sea going tug, carrying fuel for many hundreds of miles cruising. A steel deck house carried well forward and aft, with wheel house above, will give protection to the crew and furnish comfortable quarters. Her engines, full diesel, of 300 horsepower are built by Fairbanks-Morse, are fully reversible and will have pilot house control.

HAVISIDE No. 4

HAVISIDE barge No. 4, owned and operated by The Haviside Company of San Francisco, has been fitted with an additional pumping and salvage system. Nine centrifugal pumps, all of the Price type, standardized and interchangeable, as built by the G. W. Price Pump and Engine Company of San Francisco, have been made a part of the barge equipment. These pumps are in units of six 6-inch, two 8-inch, and one 10-inch. All are driven by Buda gas engines of from 25 to 60 horsepower.

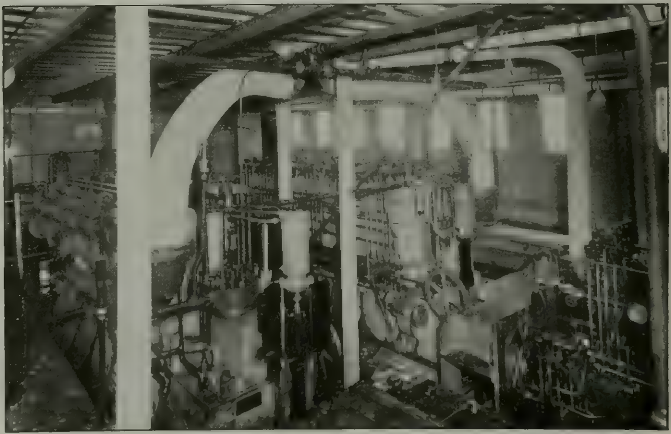
Each pump and its engine is built on a heavy steel frame fitted with eyebolts for quick handling. They can be lifted onto pontoons, taken to stranded hulls, or placed in any position at short notice. As they are independent of the steam supply of the barge they are exceedingly flexible for service. Harry Haviside, manager of The Haviside Company, believes in preparedness for any and all occasions where wrecking or salvage jobs are considered.

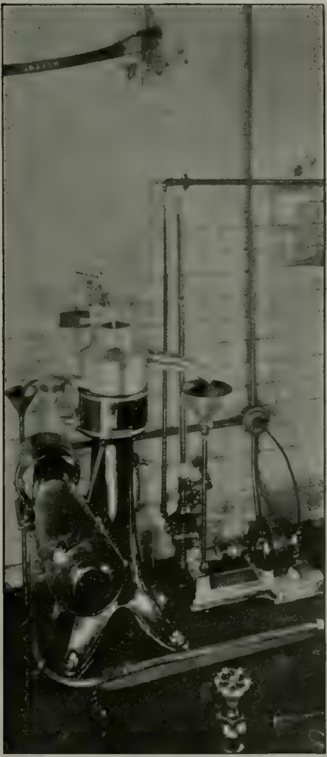
Barge No. 4 has been very successful from an investment standpoint since her entry into service. She is an asset to the Port of San Francisco, and marine insurance underwriters are pleased that such a craft is available in case of accidents.

When tugs were unable to get within distance to place lines aboard the stranded steamer Isonomia, ashore recently in Richardson Bay, an arm of San Francisco Bay, the Haviside derrick barge No. 4 was put at work and promptly pulled the craft into deep water, where tugs took her to dry-dock for overhaul.

The Isonomia is chartered for the North Pacific grain trade to Europe. She had been idle since March 31, 1925.

Converted River Towboat Shaver





At upper right the converted towboat Shaver on her trials on the Willamette River. Lower right, engine room of Shaver with two 375-horsepower, directly reversible Atlas-Imperial diesel engines. Above, the De Laval oil purifier, which insures pure lubricating oil for the Shaver's engines. The Shaver was fully described in the November issue of Pacific Marine Review.

William J. Dolon

WILLIAM J. Donlon, manager of the San Francisco branch of the Western Machinery Company, builders of Western-Enterprise diesel engines, is well informed on the building of the workboat diesel engine. Mr. Donlon was born in San Francisco, graduated from the public schools of that city, and, like many other successful engineers, entered the old Union Iron Works to learn his trade.

Leaving the Union plant after serving several years and realizing the possibilities of the internal combustion engines, he became associated with the old Hercules Gas Engine Company, remaining with them until after the big San Francisco fire, 1906. Then he joined with other well known mechanical men in forming the Imperial Gas Engine Company. After remaining with this company a number of years and assisting in establishing this engine in the marine field, Mr. Donlon was induced to assume the management of the Corliss Gas Engine Company's plant at Petaluma, California, and held that position with success until the amalgamation of Corliss with the Standard Gas Engine Company in 1916.

In that year the Enterprise Engine Company was organized by the Enterprise Foundry Company of San Francisco and H. E. Morgan and Mr. Donlon. After placing upon the market a marine gas engine that met with immediate success, this company, through the efforts of Mr. Donlon, secured the manufacturing rights of a diesel engine from the Western Machinery Company of Los Angeles and built the first commercial marine diesel engine that was manufactured in San Francisco. This was a 100-horsepower, 4-cylinder engine, which was installed in the old steam tug Rover owned by Osborn & Bornholdt.

The Enterprise Engine Company was afterwards amalgamated with the Western Machinery Company and Mr. Donlon was retained in charge of the San Francisco branch of the company. Understanding as he does, the requirements of workboats and their engines, he has made many improvements on the original model of this diesel, and the type now built by the firm is a decided advancement on the original, which has always been well known as a good, sturdy, economical prime mover.

Western - Enterprise diesel engines for marine service are popular with workboat owners. The Katherine R. of the fishing fleet out of San Pedro, has just been put into the trade with two 200-horsepower engines. The Siella, owned by the Stafford Packing Co., of Wilmington, has a Western-Enterprise diesel of 110 horsepower and is giving satisfaction.

In checking over the many installations of the Western-Enterprise diesels during the year past, it is of interest to note that four vessels so equipped have been named to compliment the engine builders. These are the Westmaco, Western-Enterprise, Enterprise, and Western. Prospects are in sight for further orders of these power units, which hold up well under the trying conditions of the fishing service in southern waters.

Too Much Propeller

DURING the Klondike gold rush of thirty years ago, many and wierd were the types of steamers sent up there. Some of these were carried up on decks of other vessels, for by no possible chance could they have ever arrived there on their own power. Others tried to do this and fell by the wayside or were never heard of after.

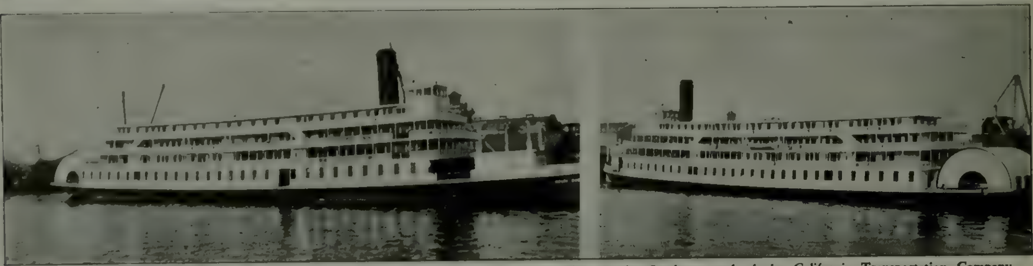
The curious craft built for Yukon River navigation were remarkable for the most part in being entirely different from anything ever seen before. One of these the writer has in mind, and was speaking of her recently to an old timer who remembered her well. This singular craft was powered by six separate engines, each driving a propeller, the idea being to get a light draft screw boat. But she proved a failure when started, for with her six engines turning the same number of propellers, she just naturally sucked all the water out from under herself where it was shoal and took the bottom solidly. When the engines were stopped she would float again in the shoal water.

The management then took out two of the engines, and she did much better. Thinking another more or less would not matter they discarded the third one. This improved things materially, so another engine and shaft was dismounted, leaving her a twin screw boat.

The illustration above shows O. H. Peters, an angler of international repute, about to start his Elto outboard motor for a little fishing on Oconomowoc Lake. Mr. Peters is an enthusiastic booster for the Elto motor.

Progress on New River Steamers

A Pacific Marine Review representative recently paid a visit to Stockton and had a look over the new river steamers Delta Queen and Delta King. These steel vessels will be operated by the California Transportation Company early in the spring of 1927. From their appearance now, these steamers will be the finest ever put into river traffic anywhere in the world. It is too early yet to describe them, but as the cost will be close to a million dollars each, some idea of their class can be imagined. Captain A. E. Anderson, the president and manager of the company, has decided to have these steamers fully finished in every detail before going into commission. The painting and finish will be allowed to set and become firm before any wear is put on it. All mechanical apparatus, from the main engines to the dish washing machines, will be thoroughly tried out and minor matters attended to before these vessels are placed on the regular run between Sacramento River points and San Francisco. Captain Anderson certainly deserves a vote of thanks from the men who will operate these new steamers for this wise decision. Undoubtedly the Delta Queen and Delta King will operate with the smooth efficiency of a well tried, well oiled mechanism, a credit to the operators.



The Delta King and the Delta Queen, palatial new river steamers under construction at the Stockton yard of the California Transportation Company.

Auxiliaries—Ship Supplies—Marine Equipment

An Efficient Cargo Handling Device

DAUGHS ship crane equipment, as built and installed by the Daughs Ship Crane Company of Portland, Oregon, is demonstrating to Pacific Coast lumber operators the possibilities in economical handling of lumber cargoes. This crane has now been in operation on the Catherine G. Sudden for six months and, in conjunction with the unit method of loading, stowing, and discharging lumber, it is making a wonderful record in savings.

The Daughs ship crane on this steamer has a 10 by 10 steam engine and a 65-foot boom which serves hatches Nos. 2 and 3, replacing four winches and four booms. This crane has the following characteristics:

Load hoist drum, speed of 150 to 200 feet per minute on whip line;

Boom hoisting and lowering, speed at end of 65-foot boom of 200 feet per minute;

Sluing to right or left, 2 to 4 revolutions per minute, crane having 360-degree swing;

Hoisting capacity, 5 tons at 50-foot radius of boom;

Radius of crane swing, 7¾ feet;

Weight of crane, approximately 21 tons—no ballast required;

All operations, hoisting, boom luffing, sluing, can be executed separately or simultaneously;

To prevent swinging of loads when handling cargo in open roadstead, a small friction drum with tag line is provided, thus insuring same load control as is possible with winches;

Crane is mounted on foundations in such manner that it is impossible for it to jump out of its bearings in a heavy sea. Boom is lowered and fastened into a boom rest when at sea;

Crane foundation is circular, diameter 10 feet, with height according to specifications;

Listing of vessel does not affect operating of crane.

The Catherine G. Sudden loads at Puget Sound, Columbia River, and British Columbia ports and discharges mainly at the ports of Oakland and Los Angeles, California. In all of these ports the crane has won unqualified endorsement.

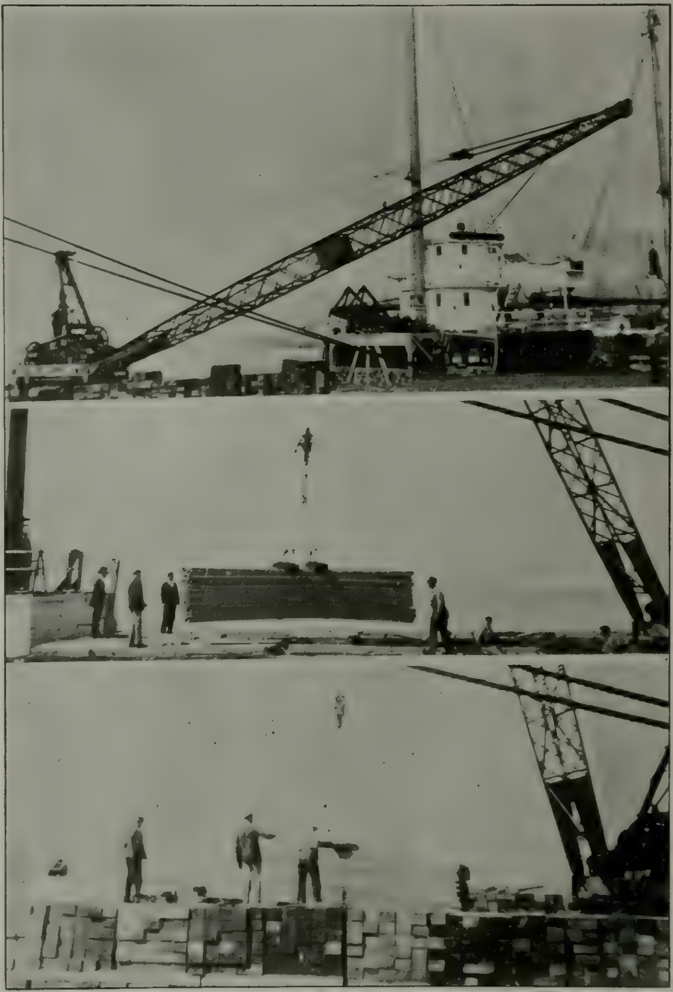
Captain Stewart, manager of the Puget Sound Stevedoring Company of Seattle, Washington, boils his opinion of this cargo handling apparatus down to a few trenchant sentences. In a recent conversation with James S. Hines, publisher of Pacific Marine Review, Captain Stewart remarked:

"The Daughs ship crane is successful. It is quicker and safer than any other type of lumber loading device in use today. It is simple. I have watched this crane in operation and I am convinced that it is by far the best device for this purpose now on the market. This is superior of all the old types of winch loading. Mr. Daughs has successfully applied to ship use the most economical method of handling materials ashore."

From the other end of the voyage J. R. Duffield, manager of the Lumber Department of the Banning Company, San Pedro, California, writes as follows:

"As you know, we handled several cargoes here off the Catherine G. Sudden while you were operating this vessel with one of your cranes installed, and I feel certain that this vessel never before discharged as economically with the regular ship's gears as it did with the crane.

"When a vessel can come into port with a cargo of better than two million and discharge in twenty-six working hours, by using only fourteen longshoremen, it appears to me one is getting value received, and the best part of it is that you do not have to depend on anyone to discharge your boat for you.

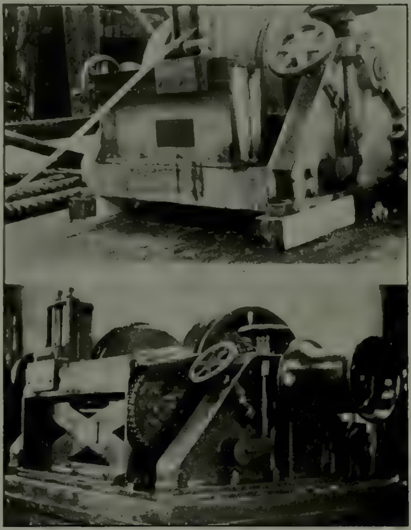


Daughs ship crane on the Catherine G. Sudden loading lumber from dock. Upper: Boom reaching out fifty feet to pick up load. Center: Load swung over ship. Lower: Dropping load into position on deck.

Markey Marine Auxiliaries

THE illustrations with this article show an interesting towing machine built by the Markey Machinery Co. of Seattle. These machines are built in five sizes to handle all classes and requirements of towing work. The capacities of these sizes run from 100 to 600 horsepower, the rating being very conservative, as all of the parts of the Markey towing machines are oversize and ample power is provided for all emergencies.

Four types of drive have been satisfactorily worked out and are in operation for these towing machines, namely, steam, electricity, compressed air, or mechanical drive from the main engine. The air drive uses a standard make of air motor operating through a worm reduction gear and makes a very compact and economical installation for diesel tugs.


Two Markey towing winches. Upper, size No. 3, for capacities of 250 to 300 horsepower, with hand control fairleader. Lower, size No. 1, 350 to 600 horsepower capacity, with automatic drive for fairleader.

All of the towing winches are of friction drum type, the adjustment of friction being by means of a hand wheel at the end of the main shaft. This type of drive enables the operator to release the cable by hand with great speed when paying out under way. The brake, which is also set with a hand screw wheel, is of extra large surface and may be set to slip automatically in the event of a sudden shock. Fairleaders, either hand or automatic as ordered, are provided as standard equipment on all of these towing winches. The automatic fairleader drive is through a standard roller chain and the cast steel fairleader itself is so mounted as to become an integral part of the base.

Markey towing winches have recently been installed for Crowley of San Francisco; Coyle of Vancouver; McGregor of Victoria; Cary-Davis of Seattle; Pleasant Harbor Towing Company of Hood's Canal; Brown of Portland; Somers Logging Company of Montana; Gilkey of Birmingham; Shaver Brothers of Portland; and Arrow Tug and Barge Company of Astoria.

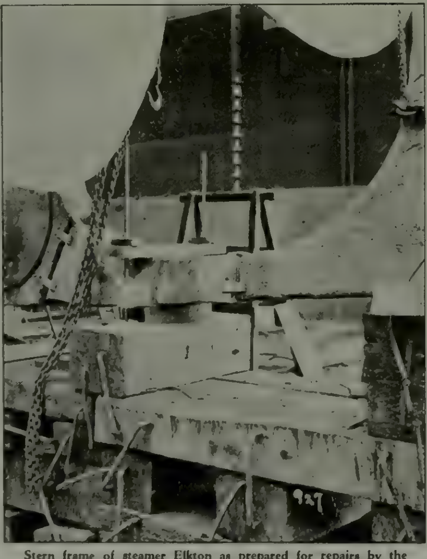
The Markey Machinery Company manufactures a large line of marine equipment, including cargo winches, automatic and electric steering engines, windlasses, capstans, and other auxiliaries. The fishing boat equipment manufactured by this firm is used extensively on Puget Sound and may be found in many installations all along the Pacific Coast.

It is interesting to note that the Markey Machinery Company has recently received an order from the Golden Gate Ferry Company for the electric steering engines for the three diesel-electric ferryboats now building at the General Engineering & Drydock Company, Alameda.

An Interesting Thermit Weld Repair to Stern Frame of Large Freight Steamer

TWO Thermit welds were made recently at James Shewan and Sons Drydock, Brooklyn, on the stern frame of the steamer Elkton of the American Pioneer Line. The Elkton was undergoing a general reconditioning for service in the Far East trade, and it was necessary to either replace her stern frame or to cut out the defective piece and insert a new slab to be welded by the Thermit process. Following the customary practice in the repair of large major marine parts the latter method was adopted.

The defective portion was cut away and a steel casting made to fit the space, leaving suitable clearance for the Thermit steel to flow into the gap. This casting was blocked up in place and rigidly secured by bolts and straps to the blocks and also held in alignment by steel straps welded to the stern frame and to the casting. Two large crucibles were set up and suitable clay molds erected around the slots. The Thermit reaction was then started and a perfect weld resulted. Thermit develops superheated steel at a temperature of 5000 degrees Fahrenheit, and this steel flows easily into any narrow slot, forming a perfect fusion weld with all steel or iron with which it comes into contact.



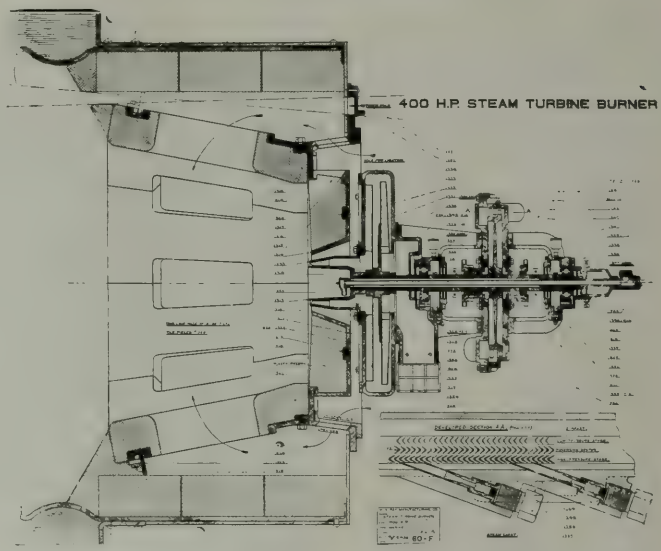
Stern frame of steamer Elkton as prepared for repairs by the Thermit welding process.

The completed welds make what is known as a permanent repair in the ratings of the various marine rating bureaus. Thermit marine repairs do not affect the insurance rates on the ship upon which the weld is made, as the welded part is rated on the same basis as a new, sound casting. Welds of this character have been made on every type of vessel ranging from small tugs and steamboats to the largest powered ships in the world.

A similar weld on a sister ship, the steamer Elbeck, was recently inspected after three years' service at sea and was found in perfect condition.

The Metal & Thermit Corporation is prepared to execute, by their own marine welding experts, major marine repairs in any port.

An Improved Ray Oil Burner



QUITE recently several important changes have been made in the Ray Rotary Fuel Oil Burners as manufactured in San Francisco and distributed wherever oil is burned as fuel. As will be seen from the sectional drawing published as an illustration with this article, this burner consists essentially of an efficient air fan and an oil distributing cup mounted on a hollow shaft, together with means for rotating said shaft, means for conducting oil to said cup, means for imparting whirling motion to air in a contra-direction to rotation of oil cup, and means for admitting and controlling secondary air for combustion. This system has produced excellent records for fuel economy and for perfect combustion in thousands of installations ashore and afloat.

The improvements recently adopted are shown on the drawing herewith, which depicts a 400-horsepower steam turbine driven Ray rotary burner as applied to the business end of a corrugated furnace in a Scotch type marine boiler. The improvement has to do with the means of admitting secondary air. The cone surrounding the flame is now made of eight pieces of tile molded with openings for secondary air, so that this air is now admitted radially against the whirling, burning, mixture of air and oil much closer to the nozzle than was formerly the case. It will be noted that this built-up tile cone is securely anchored at its inner end by a steel ring and a heavy baffle of plastic fire brick. This new construction insures a much more intimate contact of secondary air with burning oil vapor and a much finer adjustment because there is no possibility of dead or unused air in the furnace.

Three Ray rotary fuel oil burners of the 250-horsepower type were given a very exhaustive test by the Navy Department recently. These tests were the subject of a paper read before the American Society of Naval Engineers and published in the official journal of that body. Deductions made from these tests by the very conservative naval officers in charge are as follows:

Atomization with this centrifugal air atomizer is not a function of the oil pressure, but of the turbine speed, and of the velocity of the air flow through the air nozzle.

Oil of viscosity in excess of 11,000 seconds Saybolt Universal is satisfactorily atomized. This figure represents the maximum viscosity used during test—not the greatest of which this burner is capable. The more viscous the oil, the greater the advantage of operating at high turbine speeds.

Burners are slightly more efficient when burning relatively non-viscous than with more viscous oil.

Oil containing 7.8 per cent water by volume in suspension can be burned with little difficulty.

The foremost advantages of this type of atomization are:

(1) The capability of satisfactorily atomizing oil of very high viscosity, high water content, and also oil sludge or oils containing residual or sedimentary material.

(2) Knowledge of the viscosity-temperature characteristics of the oil utilized for firing—indispensable for the most efficient results in operation with mechanical pressure type atomizers—is unnecessary.

(3) Shifting of atomizer parts—tips and plugs—with changing rates, is unnecessary; great flexibility with varying load conditions is thus attained.

(4) High pressure pumps and piping are unnecessary.

Test results show perfect combustion at various loads from 10 per cent up to full rating and combined efficiencies of furnace and burner as high as 98 per cent.

Pamphlets giving full details of this remarkable test may be obtained from the W. S. Ray Manufacturing Company of San Francisco.

A Handy Valve Tool

PERHAPS there is no one circumstance quite so irritating in the life of a marine engineer at sea as a leaky valve resulting from an imperfect seat, and those ship husbands who are wise and would like to retain the respect of their engineering personnel afloat always provide means of taking care of any valve emergencies that may come up during operation of power plants.

A handy tool for the reseating of valves is illustrated herewith as manufactured by the M. B. Skinner Company of Chicago. The set illustrated is known as the Skinner combined reseating tool, and is capable of cutting a perfect new seat for all globe and angle valves with either flat or taper seat from ½-inch to 3-inch pipe sizes and also of making a perfect reseating job on any flat taper or oval seat in any valve, compression bib, faucet, gauge cock, ball cock, or lubricator valve, from 1/8-inch to 1-inch.

The cutters supplied with this set are made of imported Swedish steel and are guaranteed to stay sharp. Any dull cutter will be resharpened free of charge by the Skinner Company or their agents. This reseating tool is lined up through a long taper sleeve screwed into the bonnet of the valve, so as to preserve perfect alignment. In addition to this long guide in the taper sleeve, there is below the cock a disk with ball bearings in its outer edge which acts as a guide in the port opening of the valve below the seat. The ball bearings are backed up by springs giving them a powerful outward thrust. They project a few thousandths of an inch beyond the circumference of the disk and take up any possible play which might be found between the guide and the port opening.

The tool is equipped with screw feed which holds the cutter down to its work and absolutely prevents chatter.

Marine sales of this specialty in California are handled by the McGee Sales Agency, 75 Fremont St., San Francisco.

Ellis Channel Barges in Wide Demand

A year ago the New York Central Railroad replaced a portion of its wooden fleet of deck barges with Ellis channel steel barges for use in New York harbor. So satisfactory were the barges and so low did the maintenance cost prove that not only has the New York Central placed an additional order for ten barges but others have been quick to see the advantages of the Ellis system.

Almost immediately after the New York Central had placed their second order, the Raymond Concrete Pile Company of New York, whose pile driving barges require greater strength for a given weight than any other type of floating craft, ordered eight barges to be shipped, knocked down, for work on Lake Maracaibo in Venezuela. Like those ordered for the New York Central, these barges for South America were built by the Atlantic Works, Inc., at Boston. These barges, shipped in large sections, required only about 15 per cent of the total amount of riveting to be done at place of final erection. The speed with which the Ellis channel type of construction can be put together is shown by the fact that from the date of the signing of the contract to the date when the first boat entered the Raymond Company's service on Lake Maracaibo was exactly 100 days; 15 days of which was consumed in transit.

Soon after the order for South America was shipped the Raymond Company placed another order for a pile driving barge for use at New Orleans. This will be the first Ellis barge to be used on United States inland waters. It is now under construction by Jones & Laughlin Steel Company, Pittsburgh.

The New York Engineering Company at Yonkers is also starting to build Ellis barges. At this yard, four barges for the Red D Line and one for New York & Hastings Steamboat Company are under construction. The Red D Line barges, for use in South America, are also to be shipped knocked down and assembled at destination. The order for the New York & Hastings Steamboat Company, a subsidiary of the Anaconda Copper Mining Company, is a 900-ton deck barge, the largest Ellis barge that has yet been built.

At Milwaukee, the first Ellis barge on the Great Lakes is being built for contracting work by Edward T. Gillen. The Wisconsin Bridge Company is fabricating the steel. Pile driver and derrick are included in the equipment of the Gillen boat.

Inquiries are being received from the Pacific Coast and from foreign sources for Ellis channel barges. Among the many advantages that appeal to foreign owners is the small number of parts in the knocked down barge. The average in this respect results in a saving of about 75 per cent of parts to be shipped.

Ellis Channel System barge nearing completion.

While the efforts of the Ellis channel organization have been devoted to the design of various types of derrick, deck, covered, and pile driving derrick barges, several self-propelled deck and hold barges have been designed.

The many advantages of the Ellis channel system which have gained recognition as the strongest and least expensive type for maintenance are equally applicable to large vessels. Tentative plans have been made for craft as large as 10,000 tons.

Diesel Engine Consultant Service

H. W. Crozier

H. W. Crozier, well and favorably known in San Francisco, has established himself as a consulting engineer in the Holbrook Building, 58 Sutter Street, San Francisco, and announces that among other things he will specialize in diesel engineering, including diesel-electric marine drive, diesel-electric generating sets, and the solution of diesel fuel and lubricating problems.

Mr. Crozier is qualified to be a competent and trustworthy consultant by a long record of successful engineering accomplishment. After graduating as a machinist he completed the course in electrical and mechanical engineering at the University of California. He has served as an operating and construction engineer, has made notable contributions to oil pipe line design, and served as a member of the board of consulting engineers on the location of the California refinery of the Shell Oil Company, Martinez, California. Latterly he has served as manager of the Pacific Department of Sanderson & Porter.

Long an active member of the American Society of Mechanical Engineers and of the American Institute of Electrical Engineers, Mr. Crozier has served as chairman of the San Francisco section in each of these bodies.

Mr. Crozier has had considerable practical experience in connection with the installation and operation of the diesel-electric power plant at Tucson, Arizona. This experience should be of great value to present and prospective diesel users.

Marine Type Kohler Automatic

THE illustrations herewith show the marine unit of the Kohler automatic electric plant and a typical installation of this plant on an American yacht.

Several years ago the Kohler Automatic electric plant introduced a revolutionary improvement—powerful, far-carrying, 110-volt city electricity, supplied automatically direct from the generator, without the need for large and costly storage batteries.

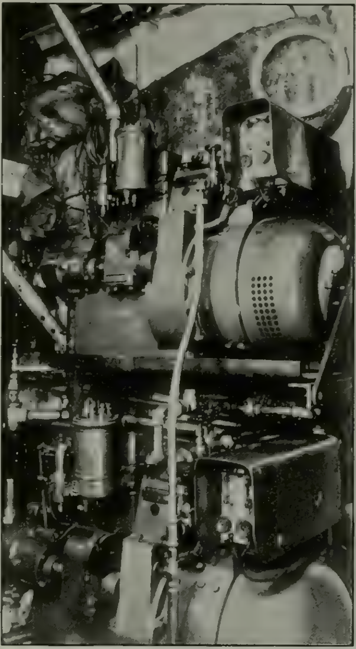
A remarkable starting switch, patented and used only on the Kohler Automatic, and an automobile-type starting battery took the place of the usual storage batteries. Turning on any lamp or appliance started the plant automatically. Turning off the last lamp or appliance stopped it automatically.

And now Kohler engineers have added a new convenience and completeness to Kohler Automatic service, specially benefiting those who, in addition to the usual needs for electrical current, must also burn one or two lights only for several hours at a time.

A new series of Kohler Automatics has been perfected, supplying 110-volt current direct from the generator when many lights or power for motors are required and, in addition, supplying 32-volt current without operating the plant, from a 32-volt starting-lighting battery.

Aboard yachts and other marine craft the 32-volt battery will supply sufficient current for the running lights and to illuminate the binnacle or pilot house and passageways.

The engine, generator and starting switch are identical with other Kohler Automatics. Only the battery used with these combination plants is larger. It is of 32-volts (instead of 24 volts) and serves a double purpose, to start the plant and to supply 32-volt current for lighting. A resistance box, which controls the rate at which this larger battery is charged with current from the plant, has also been added.



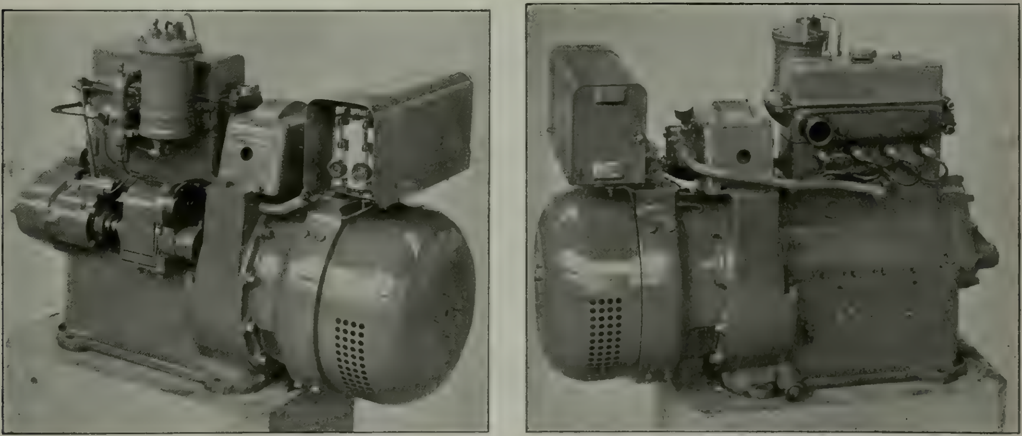
Typical installation of two Kohler Automatic marine units on an American yacht.

Instead of the ordinary two-wire system used with other Kohler plants, current may be supplied to lamps and other outlets through a three-wire system—one wire to carry out the 110-volt current from the generator, one for the flow of 32-volt current from the battery, and one which acts as a return for both the 110-volt and the 32-volt current.

Whenever 110-volt current is needed, it is necessary merely to turn the switch on any of the 110-volt lamps, motors, or appliances to be used. The plant starts automatically, supplies the 110-volt current direct from the generator, and stops automatically when all lamps and electric appliances in the circuit are turned off. 32-volt current from the battery for lighting is supplied whenever lamps in the 32-volt circuit are turned on.

The maximum of 110-volt current available for use is the same as the capacity of the Kohler plant (800, 1500, or 2000 watts) with which the 32-volt starting-lighting battery is installed. The dual-purpose battery can also be used in multiple installations consisting of two, three, or four of the 1500- or 2000-watt Kohler Automatic electric plants, which start in succession as the electrical load increases, and stop successively as the load is decreased.

On the Kohler marine type, as illustrated, the radiator and fan are eliminated and a belt driven gear pump suitable for fresh or salt water service circulates cooling water through the cylinder jackets. This marine type unit, as illustrated, incorporates a 4-cylinder, 4-cycle, 3-horsepower gasoline engine driving directly a 4-pole generator which starts automatically when the first light or appliance is turned on and stops automatically when the last light or appliance is turned off. The marine unit is manufactured also



Kohler Automatic Model D.V. - 1500-watt, 110-volt marine unit, front and rear views.

in a 2000 watt size.

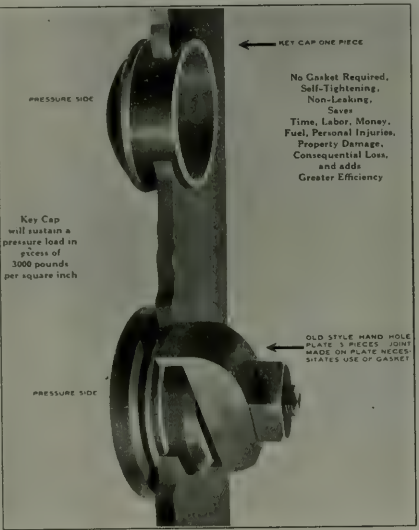
These units are giving excellent service in many American motor yachts as auxiliary light and power plants, and on many pleasure boats as the chief source of light and power, and on many steamers as emergency lighting and radio power units.

Ets-Hokin & Galvan of San Francisco and Wilmington have recently been appointed dealers for Kohler Automatic electric plants in California.

Among the well-known users of Kohler units are the Alaska Steamship Company, Seattle, 7 units; Luckenbach Steamship Company, 9 units; Col. H. H. Rogers, owner of the speed boat Charming Polly, New York; Webb Jay, 3 plants on boats at Chicago.

Key Hand Hole Caps

ONE of the innovations in boiler design introduced and adapted by the Shipping Board during the late war was the Key cap for closing hand holes in the headers of water-tube boilers. At that time the Key cap, as manufactured by the Key Boiler Equipment Company, East St. Louis, was virtually in its infancy. With each installation there was necessary the use of roller tools or expanders involving a lot of manual labor and usually producing no little profanity on the part of the marine engineer.



Contrasting modern Key cap with old style hand hole plate.

In the later development of this useful fitting, the necessity for using roller tools has been entirely eliminated and in the heading up of boilers after cleaning tubes it is now possible to insert and make tight the Key cap with the same ease as you would insert a cork in a bottle. The cap is merely put into the tapered hole from the inside and given a tap with a brass hammer or maul, which is furnished with every installation. The pressure in the boiler is then raised and the higher the pressure the tighter the plug becomes.

Today in every installation of Key plugs afloat or ashore the sale is made on the installed basis only. The Key Boiler Equipment Company sells the hole, places the cap, and guarantees a self-tightening, nonleaking, and interchangeable installation during the lifetime of the particular boiler on which the installation is made.

The Key Boiler Equipment Company is represented in the West by the E. A. Key Company Inc., of Los Angeles, and we are advised by the Los Angeles firm that at the present time they have approximately 350,000 of the new style Key caps in every day service on the Pacific Coast. A recent order from a large steamship company on the Pacific Coast called for the equipment of three Foster marine boilers having approximately 6000 hand holes with self-tightening Key caps. This equipment has now been in service for about six months, the steamer during that time having made two round voyages to the East Coast. When the boilers were subjected to a hydrostatic test only two out of the 6000 caps showed the slightest evidence of any seepage. The operating crew of this vessel are enthusiastic boosters for the Key caps, having had a demonstration that they do not require an expert with these caps to give a tight joint.

The use of Key caps insures against the blowing out of gaskets and with the consequent loss of steam, fuel, and parts from the ship, and effects, at the same time, a tremendous saving in labor time and in material costs.

Perhaps the most severe service that the Key cap has been called upon to render in the West is on high pressure petroleum cracking stills, where these fittings are required to hold hot oils at temperatures around 950 degrees and at pressures of 1000 pounds per square inch. The Key cap under these severe conditions has held up 100 per cent and all of the big oil companies in California are using these caps and are loud in their praises of this money saving fitting.

Key caps are distributed in Northern California by C. E. Rhodes Company of San Francisco.

Laminum Shims

ALL bearings are subjected to wear and therefore all bearings are usually made in halves with provision for adjustment to take up the wear. This provision is ordinarily in the way of thin strips of brass fitted between the halves of the bearing and removable so as to allow the tightening of the nuts on the bearing studs. The straightening, filing, shaping of these brass shims for bearings was one of the fine arts of the old-time operating engineer and occupied a great deal of his time and attention, to the exclusion of other equally important duties.

Recognizing this problem, American inventors sought a solution along the lines of standardization and volume manufacture with the result that we now have on the market a product known as Laminated Shims, which has for several years been practically standard specification for engine bearings. Laminated Shims are stampings of very thin brass sheet made up in large quantities and stocked for all ordinary bearing brasses. These are supplied to the engineer in bundles so that the adjustment of a bearing becomes a matter of removing or adding one of these shims on each side of the bearing.

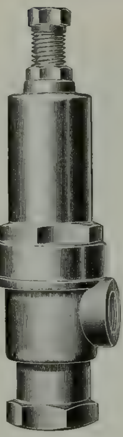
More recently a further improvement has been made by the Laminated Shim Company in the production of Laminum Shims, which are composed of layers of thin brass put together with a metallic binder, which permits peeling the layers off to the required thickness. To all appearances Laminum is a solid piece of brass. It has all of the advantages of looseleaf shims and also all of the advantages of solid brass with none of the disadvantages of either.

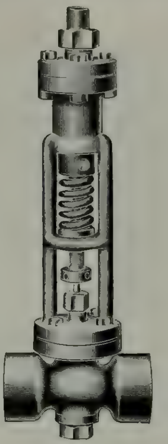
With Laminum Shims there is no necessity for filing, as the Laminum layers can be peeled off in such a way that the Laminum will "mike" to within 1/10,000-inch perfect fit. On the other hand, there are no looseleafs in connection with Laminum to crimp or get misplaced. Laminum, therefore, makes for perfect accuracy in bearing adjustment, which means proper and adequate lubrication, as it keeps the oil in the bearing where it belongs.

A number of diesel engine manufacturers have adopted Laminum shims as standard equipment for the main shaft bearings. It is interesting to note in this connection, that the 600-horsepower, directly reversible, Washington-Estep marine type, full diesel engine, which is now being installed in the conversion of the Golden Gate Ferry Company's ferryboat Golden City from steam to diesel power, is to be fully equipped with Laminum Shims in all of the bearings.

The engineering organization of the Laminated Shim Company is now prepared to give expert engineering counsel on bearing problems in Pacific Coast territory, either from the office in Oakland, California, or from the office in New York.

Bailey Steam Specialties





At left: Bailey excess pressure relief valve. At right: Bailey high pressure regulating valve.

THE Chas. M. Bailey Co. of San Francisco, are manufacturers of a complete line of steam and boiler room specialties, and automatic regulating devices, and have developed a very interesting line of specialties, such as reducing valves for almost every service, both in the high and low pressure, high and low water alarm columns, water gauges, weight loaded try cocks, back pressure valves, vacuum regulators, vacuum breakers, excess pressure pass over valves, excess pressure boiler feed line regulators, vacuum pump regulators, feed water regulators, and many other devices of similar nature.

They are also manufacturing a complete line of relief valves for water, steam, air, gas, oil, and ammonia, these they are manufacturing in sizes from ¼ inch to 3 inches, and at the present time, for any working pressure that is desired up to 10,000 lbs.

One article which they manufacture which should be of particular interest to the diesel engine manufacturers is their Excess High Pressure Air Relief Valve, which is constructed so that it will pass the high pressure over to the lesser pressure, and will maintain a constant uniform high pressure, regardless of the fluctuation of the lower pressure. This is known as an Excess Pressure Relief or Pass-Over Valve.

Another article of interest is a high pressure reducing valve, which is designed for use in rubber factories, and principally on belt presses, where hydraulic pressure is reduced from 1500 or 2000 lbs. down to any required pressure from 600 lbs. down. This regulator is something that has long been desired by the rubber manufacturers, and is now in operation in many of the bay plants giving excellent satisfaction, and doing away with the necessity of hand operation which did not prove satisfactory.

The Bailey water reducing valve is another feature of the Bailey line. This valve is fitted with a long diaphram spring permitting maximum opening. It does not require an equalizing pipe and is noiseless in operation, having an adjustment which takes care of any possible pulsation due to minimum or maximum water being used. These valves are regularly manufactured and stocked in sizes from ½ inch to 8 inches.

The Bailey Balanced Float Valves find many useful applications in maintaining constant level of liquid in any given storage, such as in a water tank or in a hot well. These valves are made either in bronze or cast iron, the bronze valves being suitable for pressures up to 300 pounds and the cast iron valves for pressures up to 250 pounds. These valves are manufactured either in the double seat or the piston type and may be had furnished complete with bell crank and float or simply with yoke and lever. This combination valve is manufactured and stocked in sizes from ½ inch to 8 inches.

The Bailey Company also manufactures a line of valves and regulators especially adapted for ammonia refrigerating plants, including an ammonia relief valve set to relieve at any pressure and so constructed that it will automatically close tight after relieving. These valves fully conform with all of the safety requirements set up by the various laws and regulations for ammonia refrigerating plants.

Another Bailey ammonia specialty is the water regulator which is designed to act automatically in cooling the ammonia condenser. When the condenser becomes heated, the ammonia pressure increases, compressing the spring of the water regulating valve and opening the water line condenser. When the condenser has become cooled to the required point the water line automatically closes. These ammonia water regulators are very simple in construction, accessible and easy of repair and regulation. They are single seated, and are guaranteed to shut off with absolute tightness.

The Bailey Company are owners of the Vulcan Engineering Company of San Francisco and are manufacturing in that plant the Vulcan line of vacuum fuel oil systems, Vulcan automatic vacuum fuel oil burners, Acme gravity fuel oil burners, and Acme steam traps.

The Vulcan fuel oil system is based on the idea of employing the partial vacuum created by the steam jet used in atomizing the oil to draw the oil into the burner, thus doing away with the necessity of fuel pumps or of locating tanks at a height sufficient to give gravity flow.

The Acme steam trap is a very simple ball float steam trap of large capacity and having several very excellent features of design which make it accessible for repairs and at the same time increase its efficiency as a remover of condensation without loss of steam. The valve in this trap is located in a boss on the cover at the highest point in the trap. This boss is covered by a cap held by two nuts. This cap on removal carries with it the valve seat and cage, leaving the point of the valve itself exposed. The valve seat is a simple disc of monel metal, which is easily reversible or renewable.

All working parts of this trap are attached to the cover.

Deterioration of Concrete In Sea Water and Preventative Methods

AN EXCELLENT and comprehensive paper entitled "Deterioration of Concrete in Sea Water and Preventative Methods" was presented before the 1926 Annual Convention of the Pacific Coast Association of Port Authorities at Portland, Oregon, by George F. Nicholson, harbor engineer of the Port of Los Angeles.

He pointed out that there has been evidence of a marked deterioration of both reinforced and mass concrete in salt water in the ports throughout the world. This is caused by a chemical action of the sulphates in the salt water and the free lime in the concrete, also from corrosion of the reinforcing steel. Photographs and specimens of scientifically made concrete that was installed only eleven years ago in Los Angeles harbor and which is now in a bad state of decomposition were submitted.

Mr. Nicholson advocates the pressure treating of dense concrete piling of maximum strength with asphalt, obtaining approximately 1½ inches of penetration, as a remedy. This process is practically the same as the creosoted timber pile treating process. Los Angeles Harbor has adopted this method as a solution of the problem and it was predicted that if some protective method was not used, that ports using concrete construction — particularly reinforced concrete—in sea water would encounter serious difficulties in future years.

Uncle Sam, Ship Chandler

By C. H. Calhoun

GENERAL George W. Goethals did more than build the Panama Canal. He did not stop with that great achievement in engineering and administration, but made efficient and adequate provision for the operation of the canal and its numerous adjuncts with a foresightedness and sureness that have resulted in but few changes in his original plans and organization.

Everything possible was done and is being done now to make the Panama Canal a great servant of shipping and commerce. A single detail of this plan was to furnish supplies to ships using the canal at reasonable prices, and from this Uncle Sam has become one of the world's biggest ship chandlers. Authority was obtained for this service in the Panama Canal Act, the title of which states that it is "To provide for the opening, operation, maintenance, and protection of the Panama Canal, and the sanitation and government of the Canal Zone."

Section 6 of this act, among other things, provides that "The President is also authorized to establish, maintain, and operate, through the Panama Railroad Company, or otherwise, drydocks, repair shops, yards, docks, wharves, warehouses, storehouses, and other necessary facilities and appurtenances for the purpose of providing coal and other materials, labor, repairs, and supplies for vessels of the government of the United States and, incidentally, for supplying such at reasonable prices to passing vessels. . ."

Under the foregoing authority the Commissary Division of the Panama Railroad Company has sold millions of dollars worth of supplies to the thousands of ships of all nations using the canal and the terminal ports of Balboa and Cristobal. There has been no desire on the part of the Panama Canal to monopolize this business, but the supplying of ships promptly and reasonably is a part of the policy of complete service to shipping at the Panama Canal.

Furthermore there is no other agency on the Isthmus capable of carrying the large and complete and diversified stock necessary for the international shipping that uses the canal, and private capital would hardly attempt the task unless assured of a monopoly. Total capital investment in the commissary supply system is at present approximately $4,000,000, and that sum is distributed as follows: plants and stores, $2,073,104.36; equipment, $91,295.87; supplies on hand, $964,564.71; floating capital about $500,000. The plant represents five wholesale units, nine retail stores, seven manufacturing plants, in addition to two electric and refrigerating plants and an industrial laboratory.

Cold Storage Plant, Mt. Hope, Canal Zone

The Panama Canal raises its own beef and much of its pork on the thousands of acres of what would otherwise be waste land in the Canal Zone. During the last fiscal year, 6150 head of cattle were sent to the $1,700,000 abattoir and cold storage plant that is operated in Cristobal. In addition to the fresh meats the canal furnishes meats that have been salted, cured, or pickled in its own plant. However, the greater part of the supplies not produced locally are imported from the United States, as unfortunately Panama has not yet taken advantage of this great market and so far has not produced enough native products to supply both the local market and shipping at the canal. The Commissary Division imports all supplies free of customs duties.

A general idea of the variety of stores required and kept on hand may be gained from the following list taken from a requisition for provisions sent in by a liner with a partly Chinese crew:

Chinese cabbage, dried white cabbage, fresh white lily roots, dried lily flower, bamboo shoots, green beans, red and white curb beans, bean sauce, bean sticks, salted black beans, seaweed, salted eggs, salted ginger, dried scallops, pickled lemons, pea oil, dried oysters, dried shrimps, plum sauce, and dried flatfish. The only item not supplied was the fresh lily roots, which are not obtainable on the isthmus.

The master or chief steward of a vessel arriving at Cristobal or Balboa can give his order to the boarding officer, making his selections from the current price list of the commissary, and continue through the canal with the assurance that upon arrival at the opposite terminal, the supplies will be delivered alongside from a special tug without any delay to the ship. It is not necessary to delay the ship while the chief steward is ashore shopping for supplies. The ship's laundry can also be sent ashore at either end of the canal and it will be delivered spic and span to the ship upon arrival at the other side of the Isthmus.

The promptness and efficiency of the service is only one of the advantages to shipping, as the supplies and stores have the backing of the government as to quality and quantity, and the prices are made just as reasonable as is possible without loss on the operations. Ships pay exactly the same prices as the employes of the Panama Canal, the United States Army and Navy, and the United States Government.

The total sales of the Commissary Division during the last fiscal year were $7,324,203.76, of which $4,419,007.40 was to employes of the Panama Canal and Panama Railroad Company, $1,780,182.10 to the United States Government and the Panama Canal, $468,291.68 to ships, and the balance to various other services connected with the government and the Panama Canal.

Not all of this business is handled by the Commissary Division, as there are a considerable number of firms in Panama and Colon engaged in supplying the shipping at the canal, and those firms, when reputable and responsible, are given licenses for their "runners" and are accorded equal facilities with the Commissary Division for carrying on the trade.

The Inchmaree Clause Again

Painting by C. R. Patterson.
"In Their Last Harbor."
(Barks B. P. Cheney, Pactolus, St. Katherine, and Hecla.)

SANCTUARY

Their wavering shadows fall upon the reeds
That nightly whisper mockeries. Their needs
Are few; no sea borne perils vex their dreams
Nor kindly fingers heal their yawning seams.

They lean, as if for comfort, mingling spars
And gossip idly neath the waning stars
Of gales that might have blown. The tides
Flood and recede within their hollow sides.

Oh God of pity-worthy things, be kind
To these. Forbid that steam and wheel shall find
Their quiet harbor, there to jibe and mock
The dying ships that rest at Antioch.

—J. A. Q.

"YES," said the underwriter, sadly, as he jingled some keys and a beer-opener in his trousers pocket, "Give 'em an Inchmaree and they'll take a mile."

The much abused clause, like the fifty-year old husband, has been misunderstood for a long time. It was originally adopted following certain English decisions in the latter part of the last century, holding that neither perils of seas, fire, nor perils "ejusdem generis" with these could be construed to include bursting of boilers.

But the clause as finally adopted went much further than the boiler question and included other protection for the assured in connection with damage during loading or unloading, breakage of shafts, and "damage to hull or machinery . . . through any latent defect in the machinery or hull" provided the same does not result from lack of due diligence.

Now the "breakage of shafts" coverage was not a direct outgrowth of the West India Telegraph Company case, nor the Inchmaree case, nor was it made necessary by other similar cases. In common with the discharging and negligence coverages, it was adopted to furnish certain additional protection to the assured and to clarify certain protection which already existed. The real reason for this charitable impulse has been more or less lost in the shuffle during the technical discussions of the past thirty years. It was probably due to a variety of factors, but the inclusion of the provision regarding breakage of shafts was due largely to the fact that the drafters of the clause desired to bring their policy more into line with those covered by Mutual Associations, which in those days in practice paid for a broken shaft without inquiry into the cause of the breakage.

The Zealandia.

No claim under the clause came before the courts until 1906, when a fractured tail shaft was found during annual overhaul of the Zealandia at San Francisco. (Oceanic Steamship Company v. Faber, 13 Com. Cas. 28, reviewed in Arnould, 11th Ed., Par. 861 a.) No material corrosion was observed in the vicinity of the fracture, and the defect which caused the condemnation of the shaft was stated to be direct result of an imperfect weld. It appeared subsequently that this welding had been done in 1891, some fifteen years prior to the attachment of the policies sued upon.

On such a state of facts, the court very properly held that there had been no material change in the shaft; that the fracture was the damage and that this was merely the development of the latent defect, and was not damage through or caused by the latent defect, but was the defect itself. It was not argued that the claim fell under the term "breakage of shafts," and in the appellate court Buckley, L. J., commented that the shaft did not break.

There was much ill-considered dicta in the case, which have since been unduly magnified. It should be remembered that the decision was actually based upon a finding that the fracture had not occurred during the currency of the policy.

After the Zealandia decision, certain underwriters began to read into it a ruling that in no case could recovery be had under the Inchmaree Clause for replacement of a part in which the latent defect had appeared.

The Ellaline.

The cases immediately following the Zealandia threw little light on the problem. In the case of the Ellaline (Hutchins Brothers v. Royal Exchange Assurance Corporation, 2 K B 406, 1911) the alleged defect was a crack occasioned during the casting of a stern frame, which the builders filled and covered with steel wash. When the matter came to light three years later, a claim for a new stern frame was made under the hull policies then current. Again it was pointed out that there had been no change in the subject matter of the insurance, that in effect, the owner had as good a vessel when the defect was discovered as when she was first delivered, and the latent defect did not arise during the currency of the policy.

The appellate court, in affirming this decision and the general principle in the Zealandia's case, took occasion to put slight damper on the extension of the latter and sug-

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gested that the judgment of Buckley, and appellate judge in the Zealandia matter, should not be taken to have the wide effect which the wording appeared to give it. One of the judges, Moulton, said:

"I think it is possible that there will arise a difficult question as to whether breakage of shafts is put in a special position, a position in which other defects of hull and machinery are not."

In Jackson v. Mumford, and again in Stott (Baltic) Steamers v. Marten, in 1914, it was held that the coverage in the Inchmaree Clause could not be extended by reference to the ejusdem generis principle. These cases represent, respectively, an attempt to collect for the breaking of a connecting rod, as similar to a shaft, and an attempt to collect for damage due to a latent defect in a floating crane alongside the insured vessel.

The Rensselaer Case.

With the law on the clause in this unfortunate state, the case of Borland v. Standard Marine Insurance Company came before the Supreme Court of New York in May 1925. (See 1925 A M C 1116).

In that case the starboard paddle shaft of the steamer Rensselaer, after fifteen years' service, was found to be fractured due to a latent defect in casting, and the trial court specifically found that the fracture developed after the policies sued on were taken out. The trial court (Municipal Court, Borough of Manhattan) gave judgment for the assured on the ground that the loss incurred by the necessary replacement of the shaft was a loss due to a latent defect within the meaning of the Inchmaree clause in the policy.

On appeal to the Supreme Court of New York (which, by the way, is supreme in name only, the ultimate appellate jurisdiction of the state being vested in the New York Court of Appeals), this decision was reversed. The reversal was influenced by certain quotations from the Ellaline and Zealandia cases mentioned above and, it is submitted, was based upon an entirely erroneous impression of those cases.

The court, with a characteristic flourish, says:

"As it is desirable that in a case of this kind the decisions should harmonize, and as we deem the construction of the Inchmaree Clause by the English Court the more persuasive, we conclude that the plaintiff's loss in this case was not covered by the policy and that it was error to award him judgment."

This in the face of express findings by the trial court that the fracture in the shaft had developed **after** the inception of the policy, and was due to a latent defect. In the Ellaline and the Zealandia cases, the development of the defect took place before the inception of the policy, and the assured's failure to recover was due to that fact.

The Rensselaer case thus decides—we believe erroneously—that there is no liability under the Inchmaree Clause for the part in which the break occurs, even though the part affected is a shaft.

It is interesting to note the reaction in London to this situation. The British marine fraternity were at first under the misapprehension that the Rensselaer case was decided by the Supreme Court of the United States and were somewhat puzzled. For the benefit of those who wish information on the status of broken shafts and latent defects in Merrie England, we reprint the following from the report of the last general meeting of the English Association of Average Adjusters:

The English Custom.

"Whilst, therefore, the decisions may be read as excluding from the clause liability for the part of the hull or machinery which has to be renewed owing to the development of a latent defect, whether or not the part actually breaks, it is generally admitted that this was not the intention of the clause, and that when a boiler bursts or a shaft breaks the renewal of the boiler or the shaft forms part of the loss or damage recoverable under the clause, and in practice the allowance has sometimes been extended to other similar cases such as the breakage of a connecting rod or piston due to a latent defect in those parts."

A more difficult question is that of a fracture appearing in a shaft or other part of the hull or machinery consequent on a latent defect but the part not actually breaking, and the practice has usually been to allow the claim for renewing the defective part if there is evidence of the fracture being due to some unusual strain and not to the ordinary working of the machinery.

It has been reported in the press that a resolution was arrived at by the Institute of London Underwriters expressing the view that Underwriters are not liable under the clause for the replacement of an article containing a latent defect when the development into a patent defect was solely due to ordinary use or ordinary wear and tear, and if only this class of case is excluded, it will, I think, meet the equity of the case and the intention of the clause, though it will not always be an easy matter to determine whether there is sufficient evidence to justify the allowance of the renewal of the defective part. It would, however, be more satisfactory if the wording of the clause were reconsidered with a view to removing so far as possible any doubt there may be as to its effect.

Educational Facilities In San Francisco

WE have from time to time received inquiries in regard to courses of instruction in marine insurance on the Pacific Coast. The very fact that such inquiries are made casts doubt on the oft-repeated assertion that the younger generation cares nothing for the opportunity for self-improvement.

Attempts at part-time education must of necessity be more or less spasmodic. There are neither funds nor a sufficient body of students to make a complete course practicable, although more or less complete courses have been successfully sponsored by Lloyds in London and by the Board of Marine Underwriters in New York.

In San Francisco, the Association of Marine Underwriters

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72 BEAVER STREET NEW YORK

309 COLMAN BUILDING, SEATTLE, WASHINGTON

have for six years maintained a study class which meets on alternate Monday evenings during the winter months. It is primarily a gathering for those already in the profession, who may obtain pointers, exchange ideas, and listen to addresses from experts in marine insurance, commodities, and allied topics.

Such an institution, however, does not meet the need for a compact, rounded course of instruction in the basic principles of the subject. There are many men and women in the brokerage, insurance, and adjusting firms of San Francisco who are adequately equipped by experience to handle some particular phase of their business, but who are more or less ignorant of the other fellow's job. There are also men and women in the larger steamship offices and in the traffic departments of various business concerns to whom a lecture course on marine insurance, general average, and insurance law would be of value.

To answer such a demand, the University of California, through its Extension Division, is offering a ten-lecture course to be delivered by the present writer starting in January, 1927. Further details may be obtained from the University Extension offices, 140 Kearny Street, San Francisco.

Disturbing Elements

THIS is in the nature of an editorial in answer to those barnacle-covered stand-patters who criticize any attempt to modify things as they are. They cling to the placid calm of the established order, even though it be wrong, and abhor the turmoil of current which, like as not, brings mud up from the bottom.

We have had one or two examples of turmoil in our midst of late. There was, for example, a great deal of acrimonious—and none the less harmless—discussion as to adjusting practice on the Pacific Coast. Probably nothing definite will come of it in the near future. The excitement will die down, the committee appointed to look into the matter will meet and disperse, as committees have a way of doing, and the matters under discussion will continue as of yore.

After the waves of argument have reached high tide and subsided, at least one element of good will has been accomplished. The evil of ignorance in some quarters will have been lessened, and the man who signs a general average agreement in the future will know something of what it's all about.

And now we note that the San Francisco Board of Fire Underwriters have appointed their customary committee (we believe it's a biennial affair) to deprecate the piratical practice of the marine underwriters in stealing the cream of the fire risks under the guise of inland marine coverage. As in the general average matter, nothing will be done about it. The marine fraternity will probably go on giving the assured more convenient protection than he can get under a fire policy, and the fire people will continue to appoint committees to investigate and complain.

No immediate change will occur. Rome wasn't built in a day, and the insurance loss on it probably isn't paid yet. But time and persistent agitation will probably bring a better measure of understanding. After the marine men burn their fingers a few times, they'll learn that they can't write a given line of business at a lower rate than their fire brethren. After the aforesaid fire underwriters appoint a few more committees, they will probably relax their rules to give substantially the same sort of combination coverage that the marine men are giving now.

At that, some of these "combination" or so-called "inland marine" policies do stray pretty far from the orthodox. They're writing truck risks, and installment furniture, and the Lord knows what else. Charlie Jones tells the story of a man who wanted a combination policy on a piano to include the risk of his inability to meet due payments in case he became sick.

But we're losing our tow-line. What we are trying to point out is that our particular part of the world is better off in at least two matters because some ornery, low-down, dyspeptic cuss let out a howl about the existing order of things.

Wherefore we write in our beatitudes—

"Blessed be the revolutionary; he starts something."

No Surveyors Allowed!

IS the above sign to be displayed at the gangplank of incoming vessels berthed at San Francisco? Several steamship lines have recently expressed the opinion that cargo surveyors—independent cargo surveyors, at least—should be included in the category of peddlers, agents, and stray cats.

Most of the cargo surveyors we have known have been amiable characters, whose greatest dereliction from the straight and narrow has been the occasional acceptance of a bottle of Scotch for overtime. And if that sin merits ostracism, California Street should be a deserted thoroughfare.

It seems, however, that the independent cargo surveyor has offended somebody by seeing too much while he was aboard. If Lower Hold No. 3 in the square of the hatch is a trifle damp while cargo is being discharged, the ship's surveyor can't always be expected to see it. He has no blanks for that kind of a report, anyway, and if he found the blanks he'd lose his job, so what have you? But the free-lance, or independent surveyor who manages to get aboard ship is looking for trouble in more ways than one, and if it's around, he finds it.

The carrier no doubt has a technical right to exclude any person from his property. Even the cargo owner himself could assert no right to inspect his property before tender of delivery. The ship, however, may lose more than it gains by asserting its right of exclusion. The facts in most cargo damage cases are peculiarly within the knowledge of the carrier, and in many such cases the conclusions to be derived from those facts are by no means clear. If the burden of proof swings in the balance, what effect will follow a showing that the carrier refused to allow inspection of the goods during discharge? The most impartial court would

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infer that something was being concealed.

So far the carriers have not actually excluded surveyors from their vessels, but they have threatened to do so. Their ostensible reason is at least ingenious. It is dangerous to allow surveyors aboard, they say, for if one of these gentry happens to fall down a hatch and be seriously injured the ship may be held liable as to an invited guest.

This difficulty could easily be overcome by having all recognized cargo surveyors sign an agreement waiving the right to recover for such injuries. Such an agreement could be incorporated into a membership card, to be carried by the surveyor and displayed at the gangplank. Such procedure might ultimately lead to the licensing of all surveyors and a consequent standardization of the value of their reports.

In the last analysis, the surveyor's business is to discover facts, and if he is to be limited in his investigations to inferences drawn some time after discharge, he might just as well stay in his office. Any attempt to restrict the consignee's already meager facilities for discovering the facts of transit comes with exceedingly poor grace from the carriers. It is to be hoped that the threat of exclusion will not be put into execution.

The Ship Market

Shipping Board Opens Bids

THE Shipping Board, on November 8, received six communications with respect to its offer to sell or charter the United States Lines and the American Merchant Lines. Five of these communications included offers to purchase one or more of the ships of these lines.

The Board, after hearing the bids read, immediately announced that the bids would be analyzed and considered and the bidders advised definitely at the earliest possible moment. Meanwhile, by action of the Board, the bids submitted by Atlantic Transport Co. and Potter Steamship Co., Inc. were thrown out because they did not conform to the specifications calling for bids. These bids only involved the purchasing of one vessel, and the Board had not contemplated selling one vessel out of the established lines.

An offer to purchase the Leviathan for the sum of $4,000,000 on behalf of the Atlantic Transport Company of New York was submitted by P. A. S. Franklin, President of the International Mercantile Marine Company. Mr. Franklin guaranteed operation under the American flag for a period of ten years, provided the ship would receive the same amount of mail traffic as it does at present.

J. H. Winchester & Company, present operators of the American Merchant Lines, offered to buy the ships they are operating for $200,000 each, or a total of $1,000,000 for the service. They also offered to charter the United States Lines at the rate of $5000 per month, plus 50 per cent of the net operating profits of the corporation, and to construct for operation on this line two new express mail-passenger ships at a cost aggregating about $30,000,000. The bidder proposed to secure $20,000,000 of the cost of these new vessels from the Shipping Board Construction Loan Fund.

William F. Kenny of New York submitted a proposal whereby he would form a corporation of American citizens to purchase the five ships of the American Merchant Lines for $1,000,000 and to charter the United States Lines under terms to be agreed upon at a later date.

Kermit Roosevelt, president of the Roosevelt Steamship Company, appeared at the opening of the bids and submitted a proposal to buy the American Merchant Lines for $252,000 per ship, or $1,210,000 for the service. His bid contemplated operation for the Board of the United States Lines by a new corporation to be formed by a group of American shipping men, including the firm of Moore & McCormack of New York.

An offer to buy either the President Harding or the President Roosevelt, both of which are now in active operation on the United States Lines, for the sum of $1,505,000 was received from the Potter Steamship Company, Inc., of New York.

The only other communication was received from the Barber Steamship Line, Inc. This communication stated that in the event the ships are not disposed of on the basis of the bids received today the Barber Company would be glad to submit an alternative proposal.

The ships now operating on the United States Lines are the Leviathan, of 59,965 gross tons, the George Washington, of 25,570 gross tons, the Republic, of 18,400 gross tons, and the President Harding and the President Roosevelt of 14,127 gross tons each.

The ships now operating on the American Merchant Lines are the American Merchant, American Banker, American Shipper, American Trader, and the American Farmer.

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Freights, Charters, Sales.

November 19, 1926.

SINCE the end of the coal strike a few days ago, the Atlantic market has declined considerably and charterers on this coast have reduced their ideas to 42/6 for Jan./Feb. wheat tonnage. There is a large surplus to be exported from Vancouver and rates should hold around 40/- through the next 60 days.

The Japan lumber market is quiet with rates at $10.75 to $10, but with liner tonnage taking care of the demand.

The Australia lumber charterers have recently paid $13.75 for January tonnage but the demand for tonnage is not heavy.

Other Pacific Coast markets remain unchanged.

The following steamers are reported fixed from the North Pacific with grain to the United Kingdom/Continent: British s.s. Blythmoor, Nov., Canadian American Shipping Co.; Japanese s.s., 36/9, Nov., Balfour Guthrie & Co.; Japanese s.s., Nov., 37/9; Japanese s.s., same, 40/-; Jap. s.s., same, 41/3, Nov./Dec.; Jap. s.s., same, 42/6; Jap. s.s., same, 40/-, option Puget Sound or Columbia River 1/3 extra; Jap. s.s. Brazil Maru, Wilmer Grain Co.; Jap. s.s. Egypt Maru, Nov., Balfour Guthrie & Co.; Jap s.s. Hoyeisan Maru, 36/6, Nov./Dec., Balfour Guthrie & Co.; Jap. s.s., 47/3, Nov./Dec., option Puget Sound or Columbia River 1/3 extra; British s.s. Callandia, 47/-, Dec., Balfour Guthrie & Co.; Jap. s.s. France Maru, Nov., Strauss & Co.; Jap. s.s. Kongosan Maru, 43/6, Nov./Dec., Kerr Gifford & Co., option British Columbia 45/-; Jap. s.s. Ohio Maru, 37/6, Nov., Kerr Gifford & Co.; British s.s. Rio Dorado, 47/-, option barley from San Francisco 52/6, Dec., Kerr Gifford & Co.; Danish m.s. Nordbo, 45/-, Nov., option Columbia River loading 46/3; British s.s. Truro City, 47/-, Dec., Canadian Wheat Pool; Danish m.s. Nordbo, 45/-, (relet) Kerr Gifford & Co.; British s.s. Yoseric, 40/-, Nov/Dec., Kerr Gifford & Co., option Puget Sound or Columbia River 41/3; Jap. s.s., 47/3, option Puget Sound or Portland 48/6, Nov./Dec.; Jap. s.s., 46/6, Nov./Dec.; Pan. s.s. Isonomia, 47/6, prompt; British s.s. Kilnsea, 46/3, option Vancouver 45/-, Dec., Kerr Gifford & Co.; British s.s. Atlantic City, 45/-, Dec.; Jap. s.s. Cape Town Maru, Dec., Balfour Guthrie & Co.; Jap. s.s. Taibu Maru, 46/3, option Columbia River 47/6, Dec., Kerr Gifford & Co.; Jap. s.s. Vancouver Maru, Nov./Dec., Balfour Guthrie & Co.

The American bktn. Forest Pride is reported taken for lumber from Puget Sound to Adelaide at $14.50, Nov. loading, by Balfour Guthrie & Co. and the Japanese s.s. Koyo Maru, Columbia River to Australia, $13.75, Dec. loading, by Pacific Export Lumber Co.

The following fixtures are reported for grain to the Orient: Jap. s.s. Seine Maru, Nov., Kanematsu Co.; Jap. s.s. Kinkasan Maru, late Oct.; Jap. s.s. Koshin Maru, Nov., Suzuki & Co.; Jap. s.s. Reiyo Maru, Nov.

The following steamers are reported fixed with lumber to the Orient: Jap. s.s. Mishima Maru, Shanghai, $10.50, Nov., Dant & Russell; Jap. s.s. Koyu Maru, Japan, $10.75, Nov., Pacific Export Lumber Co.; Jap. s.s. Ishin Maru, lump sum $39,000, Nov., Canadian American Shipping Co.; Jap. s.s. 3 ports Japan, $11, Dec.; Danish m.s. Nordhval, (relet) Japan, prompt, Douglas Fir Exploitation & Export Co.; Norwegian s.s., Japan, $11, Dec., Canadian Transport Co.

The Amer. m.s. Ruby is reported fixed from Puget Sound to Maracaibo, Venezuela, prompt loading.

The Jap. s.s. Choyo Maru is reported fixed from Columbia River to India with ties, Oct., Pacific Export Lumber Co.; Amer. s.s. Samoa from Mendocino and Eureka to Guaymas, ties, Oct., Hammond Lumber Co., and the Danish m.s. Leise Mersk, Puget Sound to Tampico and Minatitlan, box shooks, Nov., by Thorndyke Shipping Co.

The following coal fixtures are reported: Jap. s.s., British Columbia to United Kingdom, 47/6, Nov. loading; British s.s. M. S. Dollar, Hampton Roads to United Kingdom, $7, Nov.

The Amer. s.s. Catherine G. Sudden is reported fixed from British Columbia to New York, lumber, $15, W. L. Comyn & Co., Nov./Dec. loading.

The following time charters are reported: Amer. s.s. Frank D. Stout, one year, bare boat, delivery Dec., Douglas Ship Crane Co.; British s.s. Sunheath, Pacific Trade, delivery Japan, Oct., Canadian American Shipping Co.; Jap. s.s. Yaye Maru, 6 months Pacific trade, delivery Japan, Sept., Ocean Transport Co.; Norwegian s.s. Storviken, Pacific trade, 6/8 months, delivery Portland, Oct., redelivery China or Japan, South Alberta Lumber Co.; Jap. s.s. Saka Maru, 6 months, Pacific trade, delivery Japan, Yen 1.60, Nov., Ocean Transport Co.; Jap. s.s. Shinnoh Maru, 1 year, Pacific trade, delivery Japan, Yen 1.90, Oct., Yamashita Co.; Jap. s.s. Koyu Maru, Pacific trade, 4/5 months, delivery Japan, Yen 2.05, Oct., Ocean Transport Co.; Jap. s.s. Meigen Maru, same, 6 months, Yen 1.90, Oct., Suzuki & Co.; Danish m.s. Tacoma, same, time and rate not reported, Nov., Canadian Transport Co.; Jap. s.s. Nankoh Maru, same, 6 months, Yamashita Co.; Jap. s.s. Nankwa Maru, same, 6 months, Yen 1.60, Oct., Yamashita Co.; Norwegian m.s. Estrella, delivery San Francisco, redelivery Australia, $2.25, Jan./Feb., American Trading Co.; Norwegian s.s. Alaska, Pacific trade, $1.15, South Alberta Lumber Co..

The following sales are reported: Fort Bragg, San Francisco Iron & Metal Company to James K. Nelson, Inc.; American sc. Geo. E. Billings, Geo. E. Billings to South Coast Land Company; American tank s.s. District of Columbia, U. S. Shipping Board to Standard Oil Co., Calif; American s.s. Nebraskan, American - Hawaiian s.s. Co. to American parties; American s.s. Nevadan, same; Pan. m.s. Aneiura, O'Connor & Harrison to E. C. Sharpe; American sc. Spokane, H. G. Seaborn to H. Nishimoto; American sc. Alice Cooke, Lewers & Cooke to L. E. Geary, Seattle; American s.s. La Ganado, Lake Gano, and Lake Gatun, $25,000 each, U. S. Shipping Board to Stanley Hiller, Inc.; American s.s. Bert E. Haney, James V. Mason to Captain A. C. Watts; American bktn. Star of India, Alaska Packers Assn. to Dr. Harry M. Wegeforth of San Diego; American s.s. West Mingo, U. S. Shipping Board to California & Eastern S. S. Co.; American m.s. Carriso, Oceanic S. S. Co. to Flood Brothers; American s.s. Eastern Mariner, U. S. Shipping Board to Williams S. S. Co.

PAGE BROTHERS, Brokers.

Naco Anchor Chains

DURING October a very interesting order for stud link chain cable was received by the Sharon Works of the National Malleable & Steel Castings Company. This order aggregated more than a mile length of 2½-inch and 2⅜-inch cast steel stud link anchor chains for use on five new bulk freighters for Great Lakes service now building at the shipbuilding plants of the American Ship Building Company of Cleveland. It is the largest order of the kind received by the Sharon Works since the close of the war-time shipbuilding program. Chain included in this order, when completed, will weigh approximately 300,000 pounds.

Edison Sales Agency Increased

R. W. Turnbull, Pacific Coast sales manager of the Edison Electric Appliance Co., Inc., with headquarters in San Francisco, now has as his assistant, G. H. Harker, who for three and a half years, has been with the Edison Electric Appliance plant at Ontario, California. George W. Cole is in charge of marine sales in this territory, and a number of well known passenger and freight liners in Pacific Ocean trades are successfully using Edison Electric Appliance Company equipment.

It is interesting to note in this connection the constantly increasing use of electrical cooking and heating appliances aboard ship. The modern passenger afloat or ashore demands electrical conveniences and electrical appliances for cleanliness and comfort. The auxiliary power factor on most modern vessels is very important, and the saving in fuel through the use of electricity is one of the best ways of cutting down operating expense while at the same time insuring satisfaction to the traveling public.

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American Shipbuilding

A Monthly Report of Work in Prospect, Recent Contracts, Progress of Construction and Repairs

Edited by H. C. McKINNON

Shipbuilding Work in Prospect

BIDS SUBMITTED FOR RECONDITIONING OF STEAMSHIP AMERICA

Bids for reconditioning of steamer America for use on the United States Lines in the event none of the proposals for private operation of the line are accepted by the Shipping Board were opened in the office of President Dalton of the Emergency Fleet Corporation on November 15.

The proposals were as follows:

For general work, including repairs to the ship's hull and engines;

Tietjen and Lang, Hoboken, N. J., $1,550,000, with guarantee of completion before June 15, 1927.

Morse Drydock and Repair Company, Brooklyn, N. Y., $2,300,000, the work to be completed within 300 consecutive working days after delivery of the vessel at the contractor's yard.

For woodwork and finishing;

Tietjen and Lang, $167,460;

Rex Cabinet and Linoleum Co., Union City, N. J., $129,123.

John C. Knipp and Sons, Baltimore, $141,075;

George W. Smith Woodworking Co., Philadelphia, $178,000.

The Navy Yard at New York estimated $14,000 as the approximate cost of dry-docking the vessel, the estimate being made subject to the approval of the Navy Department.

CITY OF PORTLAND, OREGON, PLANS THREE FAST FIREBOATS

On November 2 the citizens of Portland, Oregon, approved a bond issue of $735,000 for the purchase and installation of fire protection devices. The first block of $300,000 will be issued in April of 1927 and will be used for the building of three fast fireboats. The work will probably be done in Portland. Plans for these fireboats are under the supervision of the Chief of the Fire Bureau.

$200,000 FIRE TUG APPROVED BY SEATTLE

Plans and specifications for a new fire tug to cost approximately $200,000, were approved by the Board of Public Works November 6. A call for bids will be issued soon. The cost of the boat will be taken care of by a bond issue.

The proposed tug will be 123 feet 6 inches in length with a 26-foot beam. It will be of all steel construction and capable of making 14 knots an hour.

She will be triple screw and will be equipped with seven 300-horsepower gasoline engines of the Sterling, Winton, or Speedway type. Four of the engines will be direct connected to 4-stage centrifugal pumps, each delivering 2000 gallons per minute at 200 pounds pressure. Two of the pumps will be connected to engines with a clutch between the engine and the pumps, so that engines in answering an alarm can be used in driving wing screws. One engine will be attached to the center screw for maneuvering in action.

The fire fighting equipment will consist of eight monitors with a total capacity of 12,000 gallons per minute, two wrecking pumps for salvaging purposes, and ample searchlights and flood lights for night work, in addition to wireless equipment and carbon dioxide gas extinguishing system to protect the ship itself and so arranged as to fight oil fires adjacent to the boat.

W. C. Nickum, naval architect of Seattle, is the designer of the boat, and George M. Mantor is fire chief.

JOHNSON LINE MAY BUILD ON PACIFIC COAST

Captain T. H. Meyer, marine superintendent for the Johnson Line of Stockholm, Sweden, brought the motorship Axel Johnson to the Pacific Coast on her last voyage, substituting for Captain D. Lillejquist, who is acting marine superintendent during Captain Meyer's absence.

Captain Meyer made the trip for the purpose of making a survey for his company of the West Coast of the United States and to consult with Fred L. Doelker, traffic manager of the line. Captain Meyer said.

"The Swedish shipyards are working full time and there is a vast amount of tonnage under construction in that country. The Johnson Line contemplates building another ship similar to the motorships Axel Johnson and Annie Johnson, both of which are operating to this Coast, but on account of the vast amount of building now under way in the Swedish yards, it is extremely doubtful if the company will be able to build the ship in Sweden." The vessel may be built on the Pacific Coast.

STANDARD OIL (CALIF.) TO CONVERT TANKER

The Standard Oil Company (Calif.), with headquarters at San Francisco, have purchased the steam tanker District of Columbia from the Shipping Board and will convert her to motor drive. John C. Rohlfs, manager of the marine department of the company, will supervise the work.

BIDS SUBMITTED FOR PUGET SOUND FERRY

Carl H. J. Stoltenberg, vice-president of the Puget Sound Navigation Company, Seattle, reports that bids submitted for the construction of a ferryboat were higher than anticipated and no decision has been reached as to the action his company will take in the matter.

The ferryboat, as designed by Lee & Brinton, Seattle naval architects, is to be 176 feet long, 50 feet beam, with a capacity of 60 automobiles and 750 passengers.

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BIDS ARE REQUESTED ON MOTOR GENERATORS

The Chief of Engineers, U. S. Army, Room 2828 Munitions Bldg., Washington, D.C., announces that at 2 p.m., December 14, 1926, proposals will be opened for furnishing motor-generator sets, transformers and accessories for use in connection with seacoast defenses.

Two motor-generator sets are to be furnished. Each is to consist of the following: 1 75-kilowatt, 115-volt, open type, direct current, generator; 1 2300-volt, 3-phase, 60-cycle, 1200-r.p.m. squirrel cage induction motor of suitable size for driving the 75-kilowatt generator.

Reference should be made to Advertisement No. 27-2, Nov. 13, 1926.

A call for bids for a diesel engine electric generating set for use in a Coast Artillery post has been issued by the Department of War. Following is the full text of the official announcement:

Sealed proposals will be opened at 2 p.m., December 9, 1926, in the office of Chief of Engineers, United States Army, Washington, D. C., for furnishing a diesel engine electric generating set, a switchboard and accessories. The engine is to be full diesel type to develop 300 b.h.p. at nominal revolutions per minute. The electric generator is to be rated at 200 kilowatts, 2300 volts, 3-phase, 60-cycles. The switchboard to be a complete control panel for the described generator.

We are informed that the Pacific Portland Cement Company of Redwood City, California, are planning to install diesel engines in one of their tugboats.

Bundesen & Lauritzen, Pittsburgh, California, are considering the building of a diesel hydraulic dredge similar to their dredge Delta now in operation.

F. L. Fulton, Antioch, California, has just completed a workboat 55 ft. long by 14 ft. beam by 6 ft. 6 in. draft, powered with a Western-Enterprise diesel engine. He is planning the construction of a sister ship.

L. H. Coolidge, naval architect of Seattle, is working on plans for a stock model trolling boat of about 42 feet length for the Ballard Marine Railway Company, also of Seattle.

RECENT CONTRACTS

Anderson & Cristofani, boat builders at Hunter's Point, San Francisco, were recently awarded a contract for the construction of a cargo boat for the Rocholl Ruffo & Company of Mexico, through A. W. Lawson, San Francisco marine architect and surveyor. The vessel will be 66 feet long, 21 feet 8 inches beam, and 7 feet depth. She will have a capacity of 80 tons of freight, and will be powered with a 110-horsepower diesel engine built by the Union Gas Engine Company of Oakland. The boat will cost about $45,000 and will be built under the supervision of A. W. Lawson and R. Z. Dickie, naval architects, and Captain R. J. Paulsen, owner's superintendent.

American Brown Boveri Electric Corp., Camden, New Jersey, has an order from the Reading Company for six steel carfloats. Two of these are to be 250 ft. long and four are to be 200 ft. long. All are to be 34 ft. 7 in. molded beam, 9 ft. depth. All deliveries are to be completed within six months.

De Foe Boat & Motor Works, Bay City, Mich., has two new jobs on hand. One is a diesel powered steel yacht for R. W. Judson of Detroit. The yacht is to be 140 ft. long, 43 ft. 6 in. beam, and 8 ft. 9 in. loaded draft. The engines will develop 600 horsepower and propel the yacht at a speed of 15 miles an hour.

The second job is a steel yacht for stock, to be 105 ft. between perpendiculars, 17 ft. beam, and 6 ft. loaded draft. This boat will have a speed of 13 miles and 200 indicated horsepower diesel engine.

Marietta Manufacturing Company, Point Pleasant, West Virginia, has several large orders. One is a contract for thirty steel discharge pontoons for the U. S. Army Engineers at Rock Island, Illinois, 38 by 14 ft. by 3 ft. 2 in.

The second order is for one steel stern-wheel towboat and twelve steel hoppered cargo barges for shipment to Colombia for service on the Magdalena River.

American Ship Building Co., Cleveland, has a new order from the Pickands, Mather & Co. for a bulk freighter to be named the Harry Coulby. The vessel will be 609 L.B.P., 65 ft. beam, 33 ft. loaded draft. She will be equipped with triple expansion, 2800 indicated horsepower engines and steam will be supplied by three Babcock & Wilcox boilers. The vessel will have a loaded speed of 13 miles and a deadweight of 13,800 tons.

American Bridge Company, Pittsburgh, has an order for a towboat hull for the Hillman Trans. Co., to be 149 ft. 2 in. long, 33 ft. 4 in. beam, and 5 ft. 10 5/16 in. depth.

Defoe Boat & Motor Works, Bay City, Michigan, has a contract from R. W. Judson, Detroit, for a steel yacht to be equipped with 600 horsepower diesel engines. The yacht will be 140 ft. long, 43 ft. 6 in. beam, and 8 ft. 9 in. loaded draft. She will have a speed of 15 miles and will be of 260 tons deadweight. Keel will be laid December 1.

This yard also is building, for stock, a steel yacht 105 ft. long, 17 ft. beam, and 6 ft. draft. She will be powered with 200 horsepower diesel engines and will have a speed of 13 miles per hour and a deadweight tonnage of 110. Keel was laid November 1.

Bethlehem Shipbuilding Corp., Ltd., Fore River Plant, Quincy, Mass., has an order for an oil barge for the City Service Transport Co.

Bethlehem Shipbuilding Corp., Ltd., Harlan Plant, Wilmington, Del., has an order for an oil barge for the Seaboard Shipping Corp.

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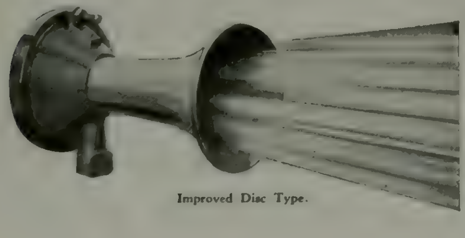

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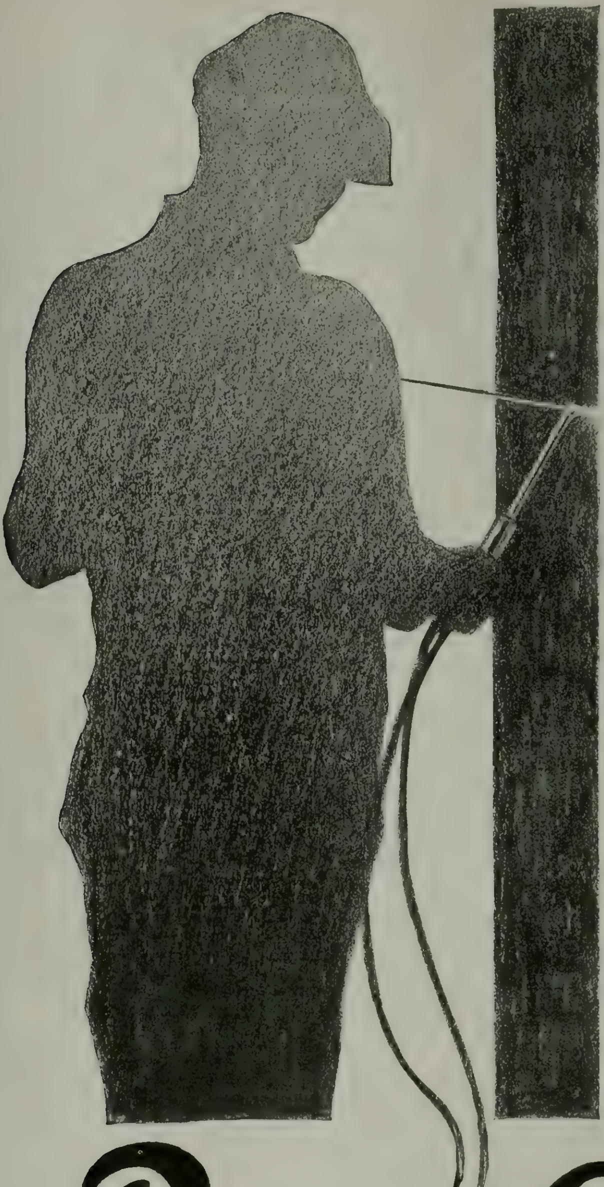

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DISSOLVED ACETYLENE

In Pacific Coast *Shipyards*

Ship Repairing – Ship Building – Reconditioning – Engine Repairs

Nashville Bridge Company, Nashville, Tenn., is building for stock one deck barge, 100 by 24 by 5 feet.

Los Angeles Shipbuilding & Drydock Corp., San Pedro, has an order from the Union Oil Company for a tow barge for refined oil deliveries at Los Angeles harbor. The barge will be 58 ft. long, 20 ft. beam, 7 ft. draft, and will carry 24,000 gallons of oil.

Babcock & Thearle, Tacoma, Washington, has an order for a 42-foot ketch-rigged sailing yacht for Fred Leckenby of Tacoma. The yacht will be 32 ft. 8 in. long, 12 ft. beam, 6 ft. draft. Besides 1000 square feet of canvas she will have an auxiliary gas engine of 40 horsepower. Phil H. Thearle is the designer.

KEEL LAYINGS

Diesel-electric ferryboat for Golden Gate Ferry Company by General Engineering & Drydock Co., Oct. 28; also keel for diesel-electric steel ferryboat for Southern Pacific Company, Oct. 28.

Two barges for Venezuela Gulf Oil Co. by American Brown Boveri Electric Corp., October.

Bulk freight steamer for Inland Steel Co. by The American Ship Building Co., Oct. 18.

Steel yacht for stock by Defoe Boat & Motor Works, Nov. 1.

Concrete mixer hull for Mississippi River Commission by Howard Shipyards & Dock Co., Oct. 21.

Two package freighters for Canada Steamships, Ltd., by Midland Shipbuilding Co., Oct 11.

Deck barge for stock by Nashville Bridge Co., Oct 18.

Steel barge for W. C. Kelly Barge Line by Chas. Ward Engineering Works, Sept. 30.

LAUNCHINGS

Buena Vista, steel passenger ferryboat for Key System Transit Company by The Moore Dry Dock Co., Nov. 22.

Charles W. Culkin and Governor Moore, diesel-electric ferryboats for Electric Ferries, Inc., New York, by American Brown Boveri Electric Corp., Oct. 21.

Wm. McLauchlan, bulk freighter for Pickands, Mather & Co., by The American Ship Building Co., Oct. 7; Robert Hobon, sister ship, Oct. 30.

Daniel A. McCormack, ferryboat for City of Boston by Bethlehem Shipbuilding Corp., Oct. 21.

Two steel carfloats for Pennsylvania Railroad by Wm. Cramp & Son Ship & Engine Building Co., Oct. 4 and 21.

Car ferry for Grand Trunk Milwaukee Car Ferry Co. by Manitowoc Shipbuilding Corp., Oct. 23.

Tugboat for New York Central Railroad by Staten Island Shipbuilding Co., Oct. 15; also wood caisson for Howland Hook, Sept. 18.

DELIVERIES

Alpine Fir, motorboat for British Columbia Forestry Dept. by Prince Rupert Drydock & Shipyard, Nov. 1.

One towboat for Carnegie Steel Corp., Pittsburgh, by American Bridge Co., Oct. 15; also 1 barge for Carnegie Steel Co.

Three barges for U. S. Army Engineers, Savannah, by Bethlehem Shipbuilding Corp., Harlan Plant, Wilmington, Oct. 14.

Carfloat for Southern Railway Co., by Bethlehem Shipbuilding Corp., Baltimore, Oct. 15.

Steel carfloat for Pennsylvania Railroad by Wm. Cramp & Sons Ship & Engine Building Co., Sept. 23.

Willets Point, diesel-electric seagoing hopper dredge, to U. S. Army Engineers, by Federal Shipbuilding & Drydock Co., Oct 9.

One tunnel boat for General Development Co. by Midland Barge Co., Nov. 9; one hull for Dillman Egg Case Co., Oct. 15.

John Cadwallader, single screw passenger and freight steamer for Baltimore & Philadelphia Steamboat Co. by The Pusey & Jones Co., Oct. 12.

Meitowax, tugboat for Long Island Railroad Co. by Staten Island Shipbuilding Co., Nov. 1.

Steel Barge for W. C. Kelly Barge Line by The Chas. Ward Engineering Works, Oct. 21.

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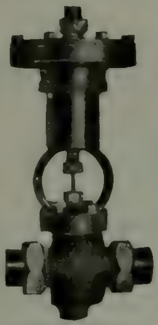
Pressure Governor No. 10
For Marine Pumps



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REPAIRS

LARGEST PACIFIC COAST REPAIR CONTRACT AWARDED

Repairs to the Associated Oil Company tanker Solano which went ashore at Purisima Point, California, on November 3 will cost $345,085 and will be made at the Los Angeles Shipbuilding & Drydock Corporation. This is one of the largest ship repair jobs ever awarded on the Pacific Coast. Five shipyards bid on the work as follows:

Los Angeles Shipbuilding & Drydock Corp., $345,085; Moore Dry Dock Company, $351,221; Bethlehem Shipbuilding Corp., $356,410; Todd Dry Docks, Inc., Seattle, $379,500; Hanlon Dry Dock & Shipbuilding Company, $383,000.

After the vessel was floated she was towed to San Pedro and her survey showed that 175 shell and keel plates would have to be removed and renewed and that only one of the vessel's keel plates was not damaged in the grounding. Both bilges were caved in and the bottom set up from 6 to 26 inches for the whole length of the vessel.

The work will be done under the supervision of George Zeh of the marine department of the Associated Oil Company, San Francisco.

The Burrard Dry Dock & Shipbuilding Company at North Vancouver, B. C., is reported to be the successful bidder for repairs to the Japanese steamer Kaiyku which was wrecked at Helmisken Island, August 27. The bid was for approximately $300,000.

Maryland Dry Dock Company, Baltimore, was recently awarded contract by the Shipping Board for repairs to the steamer West Cobalt on a bid of $41,914. The vessel has been laid up for some time at Norfolk.

Bethlehem Shipbuilding Corporation, Baltimore, will also perform repairs to a vessel taken from the laid-up Shipping Board Fleet—the West Cohas, on a bid of $38,731.

The Shipping Board steamer El Cajon, which has been laid up at San Francisco for sometime, will be put into service by Swayne & Hoyt after repairs.

Another Shipping Board vessel to be hauled from the mud flats and reconditioned for service is the West Mingo, which has been chartered by the California & Eastern Steamship Company of Los Angeles. The vessel is laid up in San Francisco Bay and will be repaired at a San Francisco Bay shipyard.

The Todd Dry Docks, Inc., Seattle, will have the work of alterations and improvements to the steamer Pansa, recently purchased from the Shipping Board by the Pacific American Fisheries of Bellingham, Washington. The cost of improvements will be in the neighborhood of $100,000. She will be equipped for the carrying of piles. The vessel is 380 feet between perpendiculars, 53 feet beam, and 29 feet 4 inches depth and is powered with a 2500 horsepower triple expansion engine and Scotch boilers.

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Prescott Tractors.

WALTER KIDDE & CO., Inc.
Rich Smoke Detecting System.
Lux Fire Extinguishing System.

"HANDY" VICTORY FLUSHOMETER VALVES.

HOUGH PATENT BOILER FEED CHECKS.

LAUNCHING SIX COAST GUARD PATROL BOATS

The first 6 of the fleet of 33 Coast Guard patrol boats now building at the Camden yard of the American Brown Boveri Electric Corporation, were launched with appropriate ceremonies on November 30. The order of launching, with names of the vessels and respective sponsors, follows:

1. Harriet Lane, Mrs. Q. B. Newman, sponsor; 2. Active, Mrs. F. A. Hunnewell, sponsor; 3. Agassiz, Miss Ruth M. deOtte, sponsor; 4. Alert, Miss Helen G. Jennison, sponsor; 5. Antietam, Mrs. Laurence R. Wilder, sponsor; 6. Bonham, Mrs. J. N. Heiner, sponsor.

A general description of the hull and power plant of the boats is as follows:

Length, over-all	125′ 0″
Length, waterline	120′ 0″
Beam, moulded, waterline	23′ 6″
Depth, moulded, amidship	12′ 0″
Draft, mean	6′ 9″
Draft, maximum	8′ 6″

Displacement full load conditions, about 220 tons.

The main propelling machinery for each vessel consists of two 150 brake horsepower, 6-cylinder, air injection, Winton diesel engines, including mechanical reverse gear, accessories and fitting. The auxiliaries, consisting of a motor driven air compressor for starting purposes; a fuel oil service pump, motor driven; a fire pump, direct connected to a 7½ horsepower, 32-volt, direct current motor mounted on common base; one 8-kilowatt, 32-volt diesel engine generator set, hand starting; refrigerating unit consisting of 13 cubic foot box and refrigerating machine with motor control and connection; one carbon dioxide fire extinguishing system, consisting of bank of 5 cylinders of carbon dioxide gas, with piping and control gear; one air single horn and air compressor with motor and control; one heating boiler, a rotary hand fuel-oil pump of approximately 6 gallons per minute capacity at 20 pounds per square inch pressure; radio motor generator; searchlight and electric windlass. The fuel-oil bunker tank under service conditions will have a net capacity of about 6,650 gallons, while the capacity of the fresh water tank is about 1500 gallons.

The trials of the main engine will consist of a two-hour dock trial with the engines delivering maximum power. When the dock trials are completed the under way trials will be held, which shall consist of a two-hour continuous run at full speed to test the machinery installation. On the first and last boats there will be trials over a measured course to obtain performance data.

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News of the Shipbuilders

SEATTLE FIRM GETS BIG GEAR CONTRACT

The Markey Machinery Co., Inc., of Seattle, has been awarded the contract for the six electric steering gears to be installed in the three new ferryboats of the Golden Gate Ferry Company of San Francisco, building at the General Engineering & Drydock Co., Alameda.

The contract is the largest single order for steering gears received by the Markey company since the end of the war period. During the war the Markey company fitted out eleven ships with electric steering gears.

The Markey company has shipped another towing machine to Thomas Crowley of San Francisco. It will be installed in one of the Crowley tugs.

It also is announced that the Markey company has taken over the manufacturing rights of the Viking diesel engine and has begun work on four engines of this type.

A large seagoing tugboat was recently launched by James Robertson's Shipyard, Alameda, California, for the Harbor Tug and Barge Company of San Francisco. The tugboat was named A. E. Williams, in honor of the general manager of the tugboat company. The tugboat is 90 feet long and is powered with a 350 horsepower Fairbanks-Morse diesel engine.

The Seattle shipbuilding firm of King & Winge Shipbuilding Company has changed its name to the King Shipbuilding Company, following the retirement of Mrs. A. M. Winge, widow of one of the founders, from the firm. The firm is now located on the East Waterway, Seattle, and carries on an extensive business in building and outfitting fishing craft and other small vessels of wooden construction.

The San Pedro Works of the Union Plant of the Bethlehem Shipbuilding Corporation recently launched a power cruiser, the Araguan, built for Warren Smith, marine superintendent for the Pan American Petroleum Corporation. The cruiser is 76 feet long and is powered with twin diesel engines.

The Shipping Board vessels Eastern Mariner, Eastern Light and Eastern Admiral have been sold to the American Merchant Marine Company of New York for $525,000. These vessels will be operated by the Williams Line and will be named the Willzipo, the Willkeno, and Willburo, respectively.

Included in the sales agreement is a stipulation that all three vessels be converted into approved types of oil burners within 12 months.

The Eastern Mariner is now laid up at Portland, Oregon, and just prior to her sale, bids were asked by the Shipping Board for preparing the Eastern Mariner for service. Low bid was submitted by Robert McIntosh of Portland, $34,672. The vessel has been laid up since 1921.

The Coastwise Steamship & Barge Company of Seattle, a subsidiary of the well-known firm of James Griffiths & Sons, has purchased the lake-type vessel City of Lordsburg, now laid up at Norfolk, from the Shipping Board.

Several new shipping firms have been incorporated in British Columbia recently, among them being the B. C. Towage and Lighterage Co., Ltd., of Vancouver, with an authorized capital of $100,000, to engage in the business of towing and salvage operations.

The Trans-Oceanic Traders, Ltd., Vancouver, was incorporated with an authorized capital of $10,000 to carry on business as general importer, exporter, forwarding agent, warehouseman, wharfinger, and merchant.

Northern Shipping Co., Ltd., of Vancouver, has been incorporated with a capital of $10,000 to engage in the business of shipowner, ship broker, agent, manager and agent of shipping properties, and freight contractor.

One of the largest reconditioning jobs ever undertaken on the Pacific Coast is that of the President Arthur, now being conditioned for the passenger carrying trade between Los Angeles Harbor and Honolulu, by the Los Angeles Shipbuilding & Drydock Corporation. The vessel is to be renamed the City of Honolulu. The Kearfott Engineering Company of New York has received an order for 90 plate glass, frameless K-90 type windows for the vessel. These windows are constructed with all brass working fittings and operate on a positive screw gear.

One of the chief outlets for diesel engines of the smaller powers on the Pacific Coast is in the conversion of tugboats and fishing craft to diesel power. One of the recent orders is that of Washington-Estep diesel engine for the American Tug Boat Company of Everett, Washington, for installation in the tug Irene. Another order has been placed for a similar engine for the tug Sound of the Gilky Brothers Towing Company of Anacortes, Washington. The engines will be of the 6-cylinder, direct reversing type, developing 270 brake horsepower.

The American Brown Boveri Electric Corporation, 165 Broadway, New York, has engaged W. R. Foster as sales engineer with headquarters at 165 Broadway, New York. Mr. Foster was formerly with the Bridgeport Brass Company.

Anticipating an increase of automobile traffic on San Francisco Bay next summer, the Monticello Steamship Company, operating a fleet of steamers between San Francisco and Vallejo on the upper part of the Bay, is having the steamer Napa Valley reconditioned to increase her automobile carrying capacity from 55 to 80. The work is being done at the Bethlehem Shipbuilding & Drydock Corp., San Francisco, and will cost approximately $150,000.

The entire upper structure of the vessel is being rebuilt, the beam is being widened fourteen feet, and the deck house and superstructure are being raised three feet three inches. The vessel is being built to have double ends to facilitate loading and unloading of automobiles.

Al Larson, Terminal Island, California, is building a fishing tender for Manuel Rosa of San Diego, to be 110 feet long and powered with 300 horsepower diesel engines.

Stevens Brothers, Stockton, California, builders of speed boats and pleasure cruisers, have seven cruisers of from 39 to 50 feet length on their ways.

Colberg Brothers, Stockton, California, are building a river freight boat 65 feet long, 25 feet beam, and 4 feet draft to be powered with a Fairbanks-Morse diesel engine. They have just completed a sister ship, the Service.

Progress of Construction

Pacific Coast

BETHLEHEM SHIPBUILDING CORPORATION, LTD., UNION PLANT

Potrero Works, San Francisco

Purchasing Agent: O W Streett.

Stockton, hull 5331, double-end diesel-electric vehicular ferryboat for Southern Pacific Co., San Francisco, 256′ L.O.A.; 44′10″ beam; 19′ depth; four Nelseco diesel engines, 450 H.P. each; keel Nov. 1/26 est.

Fresno, hull 5332, sister to above.

Tahoe, hull 5333, sister to above.

GENERAL ENGINEERING & DRYDOCK CO.,

Alameda, California

Purchasing Agent: Geo. Armes.

Not named, hull 3, diesel-electric wooden auto ferry for Golden Gate Ferry Co.; 240′ L.B.P.; 44′ beam; 11′ 6″ loaded draft; 13 knots speed; 3-400 B.H.P. Ingersoll-Rand diesel engines, direct connected to Westinghouse generators; **keel Oct. 28/26.**

Not named, hull 4, sister to above.

Not named, hull 5, sister to above.

Not named, hull 6, diesel-electric, steel automobile ferryboat for Southern Pacific Co.; 236′ L.B.P.; 44′ 10″ beam; 12′ 6″ loaded draft; 13 knots speed; 4-450 B.H.P. Nelseco diesel engs. connected to General Electric generators; **keel Oct. 28/26.**

J. C. JOHNSON'S SHIPYARD

Port Blakely, Wn.

Reed No. 3, hull 83, scow for Reed Mill Co., Shelton Wn.; 95′x33′x8′5″.

Reed No. 4, same as above.

Reed No. 5, same as above.

LAKE WASHINGTON SHIPYARDS.

Houghton, Wash.

Purchasing Agent: A. R. Van Sant.

Cruiser for Stewart Edward White, 58 feet L.B.P.; 55 H.P. Washington-Estep diesel eng.; keel Oct. 11/26

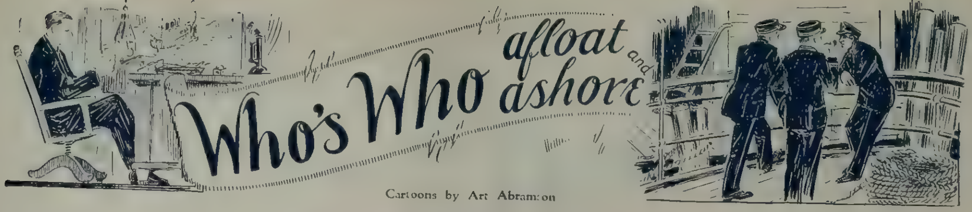
Five scows, 60 ft. long; keels Oct. 11/26.

THE MOORE DRY DOCK COMPANY

Oakland, California.

Purchasing Agent, Nat Levy.

Who's Who afloat and ashore



Cartoons by Art Abramson

WHILE nothing definite has been outlined, the diamond jubilee of the marine department of the San Francisco Chamber of Commerce will be fittingly observed some time next year.

This institution is known throughout the world, and few indeed are shipmasters who have sailed their command in through the Golden Gate that have failed to visit on 'Change.

It was in 1848 that the first lookout system was inaugurated by Sweeney & Bough, who signalled by means of a wooden semaphore from the top of Telegraph Hill when ships were sighted coming through the Golden Gate.

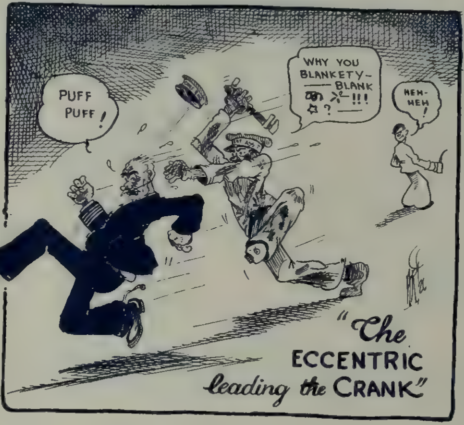
The Merchants Exchange Association took over control of the business in 1866, and their first headquarters were in the Merchants Exchange building. A lookout station was established (or rather two) at Point Lobos; one on top of the hill, the other on the level with the sea. A station was erected at the same time on Meiggs wharf.

Captain John Lowe, according to Abe Marks, present manager of the marine department of the Chamber of Commerce, was the first lookout in charge of the station at Point Lobos. Others who served in the olden days were James Farrell, William Walker, Thomas Hoyt, Captain Boyd (later a San Francisco Bar Pilot), and Mike Fitzgerald.

Early next year the new lookout station at Point Lobos, which is now nearing completion, will be ready for occupancy. The structure will be the finest of its kind in the world.

Plans are now being made for the early construction or purchase of a fast launch to meet incoming and outgoing vessels for the Meiggs wharf station, to replace the launch Jerry M. Daily.

John C. Rohlfs, manager of the marine department of the Standard Oil Company, and Frank O'Connor, of the Donovan Lumber Company, chairman and vice-chairman, respectively, of the marine committee of the marine department of the Chamber of Commerce, are determined that San Francisco will maintain her position as having the finest maritime information bureau of any port in the world.


PUFF PUFF!
WHY YOU BLANKETY— —BLANK !!!
HEH-HEH!

"The ECCENTRIC leading the CRANK"

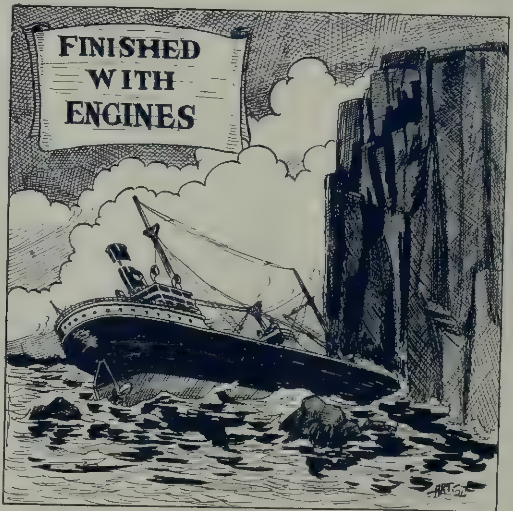
Fred L. Nason who left San Francisco recently, relinquishing, on leave of absence, his position as general agent in San Francisco for the Canadian Pacific Steamship Company, is now in New York supervising details in connection with the world cruise of the liner Empress of Scotland.

Mr. Nason will serve as cruise director. He has made many trips in past years in the same capacity. The schedule of the Empress of Scotland calls for a cruise of 132 days. The palatial liner is due to leave New York eastward on December 4, and is due in San Francisco in April 1927.

Walter Green, formerly chief officer on the Panama Mail liner Ecuador for three years, and prior to that on trans-Pacific liners of the old Pacific Mail Steamship Company, is now associated with the Banning Stevedoring Company at Wilmington, California. He is working under the direction of Thomas James, manager, one-time operating manager for the Pacific Mail company.

J. A. McDevitt, who started as an apprentice machinist at the Bethlehem Shipbuilding Corporation's San Francisco plant not so many years ago, and since going to sea has sailed out of the port of San Francisco to all parts of the world, is now chief engineer on the Panama Mail liner Venezuela.

Chief Engineer McDevitt has been first assistant engineer of the Venezuela, and was elevated when Melville Johnson was assigned to the liner Colombia as head of the engine room.



FINISHED WITH ENGINES

There is much speculation on the San Francisco waterfront as to whom Governor Richardson will appoint to succeed the late Frederick S. Knight as chief wharfinger for the Board of State Harbor Commissioners.

Up to the time that this publication goes to press there was no announcement forthcoming from William A. Sherman, president of the harbor commission, as to an appointee. However, the office is one that cannot be left vacant for any length of

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230 California street. Phone Sutter 3600.
FREIGHT ONLY.

SAILINGS—Every 2 weeks between Vancouver, Seattle, Portland, San Francisco, Los Angeles and New York, Boston, Providence, Philadelphia, Baltimore, and Portland, Me.

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430 Sansome street. Phone Kearny 2600.
FREIGHT ONLY.

SAILINGS—Semi-monthly from Seattle and Puget Sound, Portland and Columbia River, San Francisco, and Los Angeles to Houston, Beaumont, New Orleans, Mobile, Tampa, Curacao, Puerto Colombia, and Gulf of Mexico ports as inducements offer, via Panama Canal. Call at Oakland westbound.

ISTHMIAN STEAMSHIP LINES
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230 California street. Phone Sutter 3600.
FREIGHT ONLY.

SAILINGS—Intercoastal Service.
Every 5 to 7 days between Vancouver, Seattle, San Francisco, Los Angeles, San Diego, and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.

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Monthly from Baltimore to Hawaii via San Diego and Los Angeles; also monthly direct to Hawaii from Philadelphia, Boston and New York.

LUCKENBACH LINES
Luckenbach Steamship Company, Inc
201 California Street. Phone Davenport 7600.
Oakland Office and Dock: 1st and Market Sts.
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FREIGHT ONLY.
SAILINGS—North Atlantic-Intercoastal.
Every Tuesday from Seattle, every Saturday from Portland, every Thursday from San Francisco, and every Saturday from Los Angeles; also every seven days from Tacoma, Vancouver, and Oakland, to Philadelphia, New York, and Boston.
SAILINGS—Gulf.
Every 16 days from Seattle, Tacoma, Vancouver, Portland, San Francisco, Oakland and Los Angeles to Galveston, Houston, New Orleans, and Mobile.

MUNSON-McCORMICK LINE
McCormick Steamship Co., Pacific Coast agents.
215 Market street. Phone Davenport 3500.
FREIGHT ONLY.
SAILINGS—Weekly between New York and Baltimore and Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.
SAILINGS—Semi-monthly between Philadelphia, Boston (westbound) and Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.
Baltimore (westbound) and Los Angeles.
SAILINGS—Pacific Havana-Jacksonville Line.
Monthly from Seattle, Tacoma, **Portland, San** Francisco, and **Los Angeles to Havana, Cuba, and Jacksonville, Florida.**

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2 Pine street. Phone Sutter 3800.
PASSENGERS AND FREIGHT.
SAILINGS—Every 21 days from San Francisco and Los Angeles via Manzanillo, San Jose de Guatemala, Acajutla, La Libertad, Corinto, Balboa, Cristobal, Havana, and New York. Westward calls: New York, Puerto Colombia, Cartagena, Cristobal, Balboa, Corinto, La Libertad, San Jose de Guatemala, Los Angeles, and San Francisco.

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International Mercantile Marine Company.
Passenger and General Offices: 460 Market St. Phone Douglas 8680.
Freight and Operating Offices: Pacific Steamship Co., 311 California St. Phone Davenport 3300
PASSENGERS AND FREIGHT.
SAILINGS—Regular intervals between New York and San Diego, Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.

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FREIGHT ONLY.
SAILINGS—Every two weeks between Philadelphia and Los Angeles, San Francisco, Oakland, Portland.

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285 Bacon Bldg., Oakland. Phone Lakeside 3580.
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SAILINGS—Every 10 days between Port Newark and Los Angeles, San Francisco, and Oakland.
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WILLIAMS LINE
Williams Steamship Company, Inc.
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FREIGHT ONLY.
SAILINGS—Twice monthly between Seattle, Tacoma, San Francisco, Oakland, Los Angeles, San Diego, and New York, Philadelphia, Norfolk, and Baltimore.

SEATTLE

AMERICAN-HAWAIIAN S. S. CO.
Henry Dearborn, agent.
Mutual Life Bldg. Phone Eliot 8120.
Tacoma: Baker Dock. Phone Main 2243.
FREIGHT ONLY.
SAILINGS—Every 9 days from Seattle, Tacoma, **Portland, Astoria to New York, Philadelphia, and Boston.**
SAILINGS—Every 20 days from Seattle, Tacoma, Portland, Astoria, San Francisco, Oakland, **Alameda, and Los Angeles to Charleston, S.C.**

ARGONAUT STEAMSHIP LINE
Norton, Lilly & Company, general agents.
Alaska Building. Phone ELiot 2450.
FREIGHT ONLY.

SAILINGS—Every 20 days from Seattle, Tacoma, Portland, Astoria, San Francisco, Oakland, land, San Francisco, and Los Angeles and New York, Boston, Providence, Philadelphia, Baltimore, **Norfolk, and Portland, Me.**

ARROW LINE
Sudden & Christenson, agents.
Arctic Building.
FREIGHT ONLY.
SAILINGS—Westbound.
Weekly from Baltimore, fortnightly from Norfolk and Savannah to Los Angeles, San Francisco, Oakland, Portland, and Seattle.

CALIFORNIA & EASTERN S.S. CO.
Johnson Shipping Co., Inc., Agents.
5546 White Henry Stuart Bldg.
FREIGHT ONLY.
SAILINGS—Monthly from New York, Philadelphia, and Baltimore to Los Angeles, San Francisco, Oakland, and Seattle.

DOLLAR STEAMSHIP LINE
Admiral Oriental Line, agent.
1519 Railroad Ave. S. Phone ELiot 2068.
FREIGHT ONLY.
SAILINGS—Regular sailings between Seattle, San Francisco, Los Angeles, and Philadelphia, New York, Baltimore, and Norfolk.

GULF PACIFIC LINE
Swayne & Hoyt, Inc., managers.
Suite 201, Central Bldg. Phone ELiot 6383.
SAILINGS—Semi-monthly from Seattle and Puget Sound, Portland, and Columbia River, San Francisco and Los Angeles to Houston, Beaumont, New Orleans, Mobile, Tampa, Curacao, Puerto Colombia, and Gulf of Mexico ports as inducements offer, via Panama Canal. Call at Oakland westbound.

ISTHMIAN STEAMSHIP LINES
Norton, Lilly & Company, general agents.
Alaska Building. Phone ELiot 2450.
FREIGHT ONLY.

SAILINGS—Intercoastal Service.
Every 5 to 7 days between Vancouver, Seattle, San Francisco, Los Angeles, San Diego, and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.

SAILINGS—Hawaiian Service.
Monthly from Baltimore to Hawaii via San Diego and Los Angeles; also monthly direct to Hawaii from Philadelphia, Boston and New York.

LUCKENBACH LINES
Luckenbach Steamship Company, Inc.
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FREIGHT ONLY.
SAILINGS—North Atlantic-Intercoastal.
Every Tuesday from Seattle, every Saturday from Portland, every Thursday from San Francisco, and every Saturday from Los Angeles; also every seven days from Vancouver, Tacoma, and Oakland, to Philadelphia, New York and Boston.

Sailings—Gulf.
Every 16 days from Seattle, Tacoma, Vancouver, Portland, San Francisco, Oakland and Los Angeles to Galveston, Houston, New Orleans, and Mobile.

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M.S. City of S.F.	Jan. 8	Jan. 10
S.S. Ecuador	Jan. 22	Jan. 24
S.S. Corinto	Feb. 5	

From New York—Cristobal		
M.S. City of S. F.		Dec. 9
S.S. Ecuador	Dec. 18	Dec. 28
S.S. Corinto		Dec. 31
S.S. Colombia	Jan. 15	Jan. 25
M.S. City of Panama		Jan. 26
S.S. Venezuela	Feb. 5	Feb. 15

*—Ports of Call—Mazatlan, Champerico, San Jose de Guatemala, Acajutla, La Libertad, La Union, Amapala, Corinto, San Juan del Sur, Puntarenas, Balboa and Cristobal.
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Who's Who

Continued from Page 13

time, and it is expected that a successor to Mr. Knight will shortly be announced.

Mr. Knight died suddenly on October 31, following a heart attack.

Captain Andrew Martin, who was formerly port captain of the Pacific Mail Steamship Company, and who more recently has been handling the pier activities of the Associated Terminals Company at San Francisco, resigned. Captain Martin plans to take a few weeks vacation before joining another steamship organization.

Chief Engineer John Muir of the Panama Pacific liner Finland is recovering from an operation on his eyes, performed in a New York hospital. He is now well on the way to recovery and will be able to return to his post on the next westbound sailing of the liner.

First Assistant Engineer William Hand has been in charge of the engine room of the Finland during Mr. Muir's illness.

J. M. Alexander is now a member of the deck officer's department of the liner Mongolia. He was formerly skipper of the American-Hawaiian freighter Mystic, and while the Mongolia was in port he visited his former shipmates on the Mystic, which was also in San Francisco harbor at the same time.

Mr. Alexander was at one time staff captain of the liner Reliance of the Hamburg-American fleet.

Vacation time is now underway among the masters, deck and engine room officers of the Admiral Line fleet.

Andrew Wishart, chief engineer of the liner Ruth Alexander, is back at his post after a hunting trip to Canada.

Captain Charles Borg, master of the Admiral Schley, is now hibernating in the woods of northern California, while Skipper Alfred Peterson, who has been pilot of President H. F. Alexander's steam yacht Arquillo, is in command of the Schley.

Continued on Page 20

INTERCOASTAL

PANAMA-PACIFIC LINE

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Pacific Steamship Company, freight agents.
PASSENGER AND FREIGHT.
SAILINGS—Regular intervals between New York and San Diego, Los Angeles, San Francisco, Oakland, Portland, Seattle, and Tacoma.

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FREIGHT ONLY.
SAILINGS—Every two weeks between Philadelphia and Los Angeles, San Francisco, Oakland, and Portland.

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ARGONAUT STEAMSHIP LINE

B. W. Greer & Son, Ltd.
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FREIGHT ONLY.
SAILINGS—Every two weeks between Vancouver, Seattle, Portland, San Francisco, Los Angeles, and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.

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Phone Seymour 8420.
FREIGHT ONLY.
SAILINGS—Every 30 days, Vancouver to Montreal (to Halifax during close of navigation) Through bills of lading from other Pacific Coast ports.

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SAILINGS—**Intercoastal Service.**—Every 5 to 7 days between Vancouver, Seattle, San Francisco, Los Angeles, San Diego and New York, Boston, Providence, Philadelphia, Baltimore, Norfolk, and Portland, Me.
SAILINGS—**Hawaiian Service.**—Monthly from Baltimore to Hawaii via San Diego and New Angeles; also monthly direct to Hawaii from Philadelphia, Boston, and New York.

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(Operating U.S.S.B. vessels).
430 Sansome Street. Phone Karny 2600.
FREIGHT ONLY.
SAILINGS—Regular Intervals from Los Angeles, San Francisco, thence direct to Yokohama, Kobe, Shanghai, Hongkong, Manila and Singapore. Also calls at Dairen, Taku Bar, Saigon and Cebu if inducements offer.

DOLLAR STEAMSHIP LINE

The Robert Dollar Co.
311 California street. Phone Garfield 4300.
Oakland office: 406 Thirteenth St.
PASSENGERS AND FREIGHT.
SAILINGS—Weekly from San Francisco to Honolulu, Kobe, Shanghai, Hongkong, Manila, Fortnightly to Singapore, Penang, and Colombo.
FREIGHT ONLY.
SAILINGS—Regular sailings between San Francisco and Yokohama, Kobe, Shanghai, Hongkong, Manila, Singapore, Sourabaya, Samarang, and Batavia.
SAILINGS—**Guam Service.**—Regular sailings between San Francisco, Pearl Harbor, Hawaii, Guam, Cavite (Manila), and Java.

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FREIGHT ONLY.
SAILINGS—Monthly from San Francisco to Portland and North Pacific ports, thence to China and Japan.

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551 Market Street.
PASSENGERS AND FREIGHT.
SAILINGS—Liners in the California-Orient service sail fortnightly from San Francisco for Japan and China ports via Honolulu. One sailing every six weeks of liners in the Orient-California-Chile service. These ships call at Mexican, Canal, and South American ports. The Oriental ports of call are Yokohama, Kobe, Moji, and Hongkong.

OREGON ORIENTAL LINE

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Columbia Pacific Shipping Company.
Sudden & Christenson, agents.
230 California street. Phone Garfield 2846.
FREIGHT ONLY.
SAILINGS—Every 3 weeks from Portland to Orient, calling at Yokohama, Kobe, Shanghai, Taku Bar and Dairen, returning via San Francisco.
SAILINGS—Every two weeks from Portland to Yokohama, Kobe, Hongkong and Manila, returning direct to Portland.

OSAKA SHOSEN KAISHA

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310 Sansome St. Phone Sutter 7400.
FREIGHT ONLY.
SAILINGS—**San Francisco Service.**
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PASSENGERS AND FREIGHT.
SAILINGS—**Los Angeles Service**—A steamer a month to Koke, Yokohama, Yokkaichi, Nagasaki, Hongkong, Saigon, Singapore, Colombo, Durban and Cape Town. These vessels are operating in round-the-world service and on their home-bound trip call at Santos, Buenos Aires, Rio de Janeiro, New Orleans, the Panama Canal and Los Angeles.

YAMASHITA KISEN KABUSHIKI KAISHA

Yamashita Company, Inc., agents.
404 Robert Dollar Bldg. Phone Dav. 2572.
FREIGHT ONLY.
SAILINGS—Semi-monthly from Puget Sound and Portland to Yokohama and Kobe and irregular service from China and Japan ports to San Francisco, Portland, and Seattle.

SEATTLE

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Stuart Building. Phone ELiot 0147.
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SAILINGS—Tramp service between Seattle and Oriental ports of Yokohama, Kobe, Nagoya, Shimidzu and Moji.

MITSUI & COMPANY, LTD.

(Mitsui Bussan Kaisha, Ltd).
American Bank Building. Phone ELiot 1450.
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SAILINGS—Monthly from San Francisco, Portland, Seattle and Puget Sound ports, thence to China and Japan.

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Colman Building. Phone ELiot 3513.
PASSENGERS AND FREIGHT.
SAILINGS—Every 10 days, calling at Victoria or Vancouver, B. C., Yokohama, Kobe, Nagasaki, Shanghai, Hongkong, or other Oriental ports as inducements offer.

OCEAN TRANSPORT CO., LTD.

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FREIGHT ONLY.
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WALKER-ROSS, INC.

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Central Building.
FREIGHT ONLY.
SAILINGS—Every 2 weeks from Seattle to Yokohama, Kobe, Osaka, and Nagoya.

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PASSENGERS AND FREIGHT.
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FREIGHT ONLY.
SAILINGS—Regular sailings between Los Angeles, San Francisco and Yokohama, Kobe, Shanghai, Hongkong, Manila, Singapore, Sourabaya, Samarang, and Batavia.
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Transportation Bldg. Phone VAndike 6171.
PASSENGERS AND FREIGHT.
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Who's Who

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Chief Engineer John E. Kane of the Admiral Fiske is now in the East on a vacation, visiting relatives. He will return shortly after the first of December.

To confer with P. A. S. Franklin, president of the International Mercantile Marine and other officials, Leo E. Archer, Pacific Coast manager of the company, is now in New York.

Mr. Archer will visit the Newport News Shipbuilding & Drydock Company while East to make an inspection of the new liner California, which is the first of three giant liners the company plans to place in the New York-San Francisco service.

Two vessels that are well-known on the Pacific Coast are being dismantled for the scrap heap. They are the old China Mail liner Nile and the transport Hancock.

Work of dismantling the vessels is being carried out by the Haviside Company at the yards of the General Metals Company, formerly the plant of the Union Construction Company, Oakland, California.

Acetylene torches are rapidly reducing the hulls of the vessels, and they are being hoisted into the scrap heap by Haviside derrick barges.

The Hancock was the famed old Arizona, which plied the Western Ocean until being sent to San Francisco during the Spanish American War. When the craft arrived in that port she was the largest vessel to enter the harbor, and was moored at the foot of Folsom street, where the old transport dock was maintained. For years the Hancock swung at anchor at the Mare Island Navy yard until being towed to the Oakland yards to be scrapped.

For the first time in nearly five years a job of taking out masts and replacing them was carried out recently in San Francisco on a sailing ship. The work was performed on the former motorship Annie Johnson.

This craft was sold some time ago by the Matson Navigation Company to a South Seas trading company, and

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815 Hastings St., W. Phone Seymour 8014.
PASSENGERS AND FREIGHT.

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B. L. Johnson, Walton & Company, agents.
837 Hastings street, W. Phone Seymour 7147.
FREIGHT ONLY.

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SAILINGS—Monthly from Vancouver, Puget Sound, Portland, San Francisco, Los Angeles, San Diego to Liverpool, London, Hull and other United Kingdom and Continental ports as inducements offer. Through bills of lading issued to Scandinavian, Baltic, Portuguese, Spanish, Mediterranean and Levant ports, via Hull.

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PASSENGERS AND FREIGHT.

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SAILINGS—African Service.
Monthly from Pacific Coast ports; through bills of lading being issued for principal ports of West, East, and South Africa, with transshipment at Genoa or Naples.

NORTH PACIFIC COAST LINE
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120 Market street. Phone Douglas 7510.
PASSENGERS AND FREIGHT.

SAILINGS—Every 2 weeks between Vancouver, Puget Sound, Columbia River, San Francisco, Oakland, Los Angeles, and Liverpool, London, Rotterdam, Antwerp, Hamburg, Havre, Glasgow.

NORWAY PACIFIC LINE
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FREIGHT ONLY.

SAILINGS—Every 30 days from San Francisco and Los Angeles to United Kingdom, Continental ports and Scandinavia.

SOCIETE GENERALE DE TRANSPORTS MARITIMES A VAPEUR
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230 California street. Phone Sutter 3600.
FREIGHT ONLY.

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UNITED AMERICAN LINES, INC.
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230 California street. Phone Garfield 2846.
For passengers. Phone Sutter 46.
PASSENGERS AND FREIGHT.

SAILINGS—Fortnightly from Vancouver, Seattle, Portland, San Francisco, and Los Angeles, to Antwerp, Hamburg, and Bremen; with call at United Kingdom ports when inducements justify.

SEATTLE

EAST ASIATIC COMPANY, LTD.
The East Asiatic Company, Inc., agents.
1222 Alaska Building. Phone ELiot 9104.
PASSENGERS AND FREIGHT.

SAILINGS—Regular service, Pacific Coast ports direct to Hamburg, Hull, Copenhagen, with trans-shipment to all Scandinavian and Baltic ports.

ELLERMAN & BUCKNALL STEAMSHIP CO., LTD.
Norton, Lilly & Company, general agents.
Alaska Building. Phone ELiot 2450.

FREIGHT ONLY.

SAILINGS—Monthly from Vancouver, Puget Sound, Portland, San Francisco, Los Angeles, San Diego to Liverpool, London, Hull and other United Kingdom and Continental ports as inducements offer. Through bills of lading issued to Scandinavian, Baltic, Portuguese, Spanish, Mediterranean and Levant ports, via Hull.

FRENCH LINE
(Compagnie Generale Transatlantique).
General Steamship Corporation, agents.
Colman Building. Phone ELiot 5706.
FREIGHT ONLY.

SAILINGS—Twice a month from Vancouver, Seattle, Portland, San Francisco, Los Angeles to French and other Continental and United Kingdom ports via Panama Canal and West Indies.

FURNESS LINE
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Furness (Pacific), Ltd.
Burchard & Fisken, Inc., agents.
705 Arctic Building.
PASSENGERS AND FREIGHT.

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GENERAL STEAMSHIP CORP.
Colman Building. Phone ELiot 5706.

SAILINGS—From Pacific Coast ports to London, Hull, Leith, also Scandinavian and Irish ports as inducements offer.

HARRISON DIRECT LINE
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Who's Who

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the craft has been changed to French registry and renamed the Bretagne.

Sale of the former Annie Johnson marked the last of the sailing ships of the Matson Line. Back of the vessel is the memory of forty years ago when, as the British bark Ada Iredale, the vessel caught fire in midocean and floated the Pacific unmanned for eighteen months, until her burned hulk was picked up and towed into Tahiti.

Later the Matson interests secured the vessel and again rigged her as a bark. In 1908 the vessel was re-rigged as a four-masted schooner and a few years later auxiliary engines were installed. During her service for Matson the Annie Johnson carried hundreds of thousands of tons of sugar and molasses between Hawaii and San Francisco.

The masts installed in the Bretagne are about 140 feet in height. The craft will ply between South Sea ports and San Francisco.

Captain Ivan L. Peterson, who served for many years with The Moore Dry Dock Company as general estimator, has just returned from six months in Alaska. Captain Peterson is interested in oil holdings in the Chikaloon fields. He sailed the Alaskan coast for many years in the days of the Klondike as master of a trading schooner.

W. P. Bannister, assistant operating manager for the Admiral Line, is back at his desk after a week's illness.

The Admiral liner Emma Alexander is again in service in the Seattle-San Francisco-Los Angeles-San Diego run, after undergoing cleaning, painting, and general overhauling.

The Panama Mail liner Colombia will sail from San Francisco on February 19 with the first winter tropical cruise of the year, according to William A. Young, Jr., general passenger traffic manager.

The cruise will cover thirty-five days by sea and land, and the itinerary calls for a trip of 7000 miles, visiting seven countries, including Mexico, Central America, South America, Panama, and Cuba.

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Correct Practice In Cutting Steel

BECAUSE of the wide usefulness of the oxy-acetylene blowpipe for cutting steel, wrought iron, and cast iron, and the general acceptance of this process for all sorts of work, it is probably unnecessary here to describe the process or its applications to any great extent. It is well known that all commercial forms of iron can be rapidly and accurately cut with oxygen and acetylene used in properly designed and constructed apparatus.

The operation is a chemical one. The essentials are these: a spot of metal is heated to kindling temperature by means of the so-called preheating flames of the blowpipe. A jet of oxygen is directed against this preheated spot, whereupon rapid oxidation (or actual burning) of the metal takes place. This action, properly controlled, will cut through the metal section, and the cut will progress along a predetermined line as the blowpipe is moved ahead by the operator. The preheating flames to some extent, and to a greater degree the oxidation of the metal itself, maintains temperature in the piece high enough for the process to be continuous.

It is desirable that surfaces to be cut by the oxy-acetylene process be clean, for the obvious reason that the cutting reaction is one between the cutting oxygen and the metal. As far as possible, rust, scale, dirt, and paint should be removed along the line of cut.

It is not an economical practice to use oxygen pressure to blow away dust and dirt, as is sometimes done. This will add to the cost of cutting by using oxygen for an unproductive purpose.

For practice in cutting, it is best to start with a piece of ½-inch steel plate about 6 inches wide. Rule a chalk line about ½-inch from one edge of the plate and place the plate so this line just clears the far side of the welding table.

Adjust oxygen pressure for ½-inch metal. Then put on goggles, light the blowpipe, adjust the pre-heating flames to neutral with cutting oxygen valve open, and switch off the cutting oxygen.

Hold the blowpipe so the preheating flames just touch the end of the chalk line on the steel plate edge. Hold the blowpipe steady until this spot has been raised to a bright red heat, then open the cutting valve and move the blowpipe slowly, but steadily, along the chalk line. If the cut has started properly, a shower of sparks will fall from the under side of the plate. This indicates that the cut is penetrating clear through. The movement of the blowpipe should be just fast enough so the cut continues to penetrate the plate completely. If the blowpipe is moved too rapidly, the cutting jet will fail to go clear through the plate and cutting will stop. Should this happen, immediately close the cutting valve and preheat the point where the cut stopped until it is a bright red. Open the cutting valve and restart the cut.

If, on the other hand, the blowpipe is not moved rapidly enough, the heat of the preheating flames will tend to melt the edges of the cut, producing a very ragged appearance, or at times fusing the metal together.

At first the beginner may be surprised to find that although he has apparently cut entirely through the plate, still the two pieces hold together. What has happened is simply that some of the slag produced by the cutting action has bridged across and on cooling holds the two pieces of plate together. This slag is quite brittle, so the plates can be easily separated with a blow from the hammer.

When the student has become proficient in making the straight cut described, he should vary the experiment by marking simple designs or curves on a piece of 3/8 or ½-inch plate and then practicing until he is able to follow the lines smoothly with the blowpipe.

Beveling is a common operation with the cutting blowpipe and is accomplished simply by holding the blowpipe head at an inclined angle instead of vertically. For example, place a piece of ½-inch plate so that one edge projects 3 or 4 inches over the side of the welding table. Incline the blowpipe head at an angle of 45 degrees to the top surface, and cut a triangular prism off the edge. After the cut is finished, the piece of plate remaining will have one edge beveled at an angle of 45 degrees. Blowpipe control during beveling is somewhat more difficult than when making a vertical cut, so that much practice may be required.

Piercing holes is also a useful operation to learn. Support a small piece of ½-inch steel plate between two firebrick on top of the welding table. Hold the blowpipe just over the center of the plate until the preheating flames have heated a round spot bright red. Open the cutting valve gradually, so as to avoid blowing slag back into the blowpipe tip. It will be found that a small round hole can quickly be pierced right through the plate.

Where a hole of larger size is desired in the plate the proper procedure is as follows: First mark with chalk the line that will form the edge of the hole, which may be circular, rectangular or irregular. Then at some point inside of this outlined area pierce a hole with the cutting blowpipe as described in the preceding paragraph. Start a cut from this point, gradually working toward and finally following the line that has been drawn on the plate. In this way the hole will have clean, sharp edges all around. Truly round holes can be made with a radius bar or a compass, one leg of which is fixed at the center, and the other made of the blowpipe nozzle.

In cutting heavier steel plate, more attention must be paid to preheating and to careful regulation of the speed with which the cut is made. A piece of plate 1 or 1½ inches thick makes excellent practice material. Mark a line across one end of the plate and heat one end of this line to a bright red as before. Be sure that the spot is thoroughly heated before opening the cutting valve. When the cut has started, watch the jet of sparks that falls from the underside of the plate. If this should stop and shoot out horizontally for a time, it means that the cut has ceased to penetrate clear through the plate. It will be found that more skill is required to keep the cut going steadily in heavier plate.

As thickness of the member to be cut increases, greater care and attention must be given to handling the blowpipe. The cutting valve should be opened slowly in starting the cut, and the operator must watch carefully all the time to be sure that the cut is extending entirely through the piece before advancing the blowpipe.

The cut will "lag" somewhat. That is, the top will always be a little further advanced along the line of cut than the bottom. This action has no ill effect unless it becomes too pronounced, say until the lag is more than 10 deg. off the vertical. Beyond this, difficulty may be encountered as the cut approaches the center of the piece. To prevent the lag from becoming too great, oscillate the blowpipe slowly across the line of cut.

Round sections can be cut much more easily than otherwise if the metal at the starting point is first nicked with a cold chisel. This gives a better surface for beginning the cut.

It is best practice, in adjusting the oxygen pressure in all oxy-acetylene cutting, to follow closely the recommendations of the blowpipe manufacturer for the thickness of metal involved. It is a mistake to assume that increasing the oxygen pressure over that recommended for a given thickness will increase speed or ease of cutting. Actually it will do neither, but an excess in oxygen pressure may retard the work seriously, especially on very light or very heavy sections.

There is practically no limit of thickness in cutting by the oxy-acetylene process. When operations with the blowpipe alone become slow or difficult the oxygen lance can be used to supplement it. This latter method of cutting is especially useful on thick, dirty metal containing large amounts of slag or other refractory material. Methods for cutting with the blowpipe and lance are described in "The Oxygen Lance in Blast Furnace and Steel Plants," which is available at all district sales offices of the Linde Air Products Company.